umber 1
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$3.00 with Directory

1868 1912

TEXTILE WORLD RECORD

OCT 16 1912

Special Features

Styles and Colorings for the Heavy Weight Season of 1913

Cotton Spinners as Cotton Growers

The Shrinkage of Wool

The Size of Yarn for Required Weight of Knit Goods

Coating Cotton Duck

Figure Designing

Some Kinks From An Old Time Knitter

LORD & NAGLE COMPANY · BOSTON, MASS.

JOHN JEPSON, BOSTON

able of Contents Page 65 Buyers Index Page 163 Index to Advertisements Page 173

The TEXTILE-FINISHING MACHINERY CO.

Howard Building, Providence, R. I.

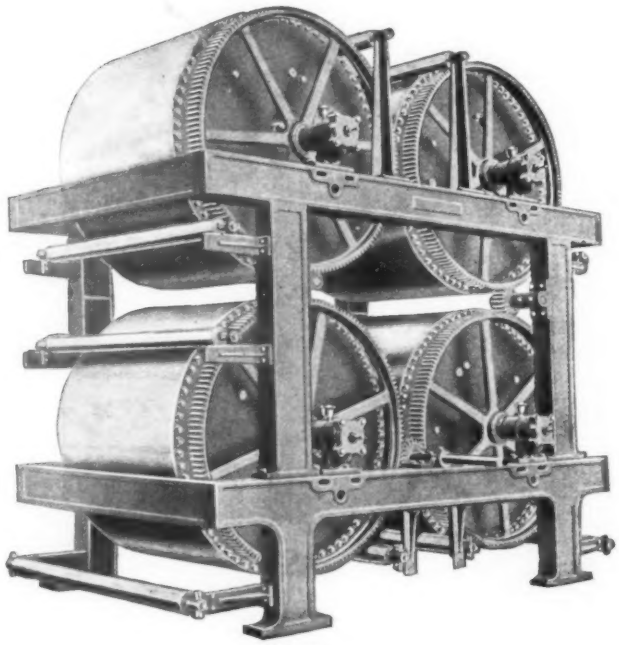
BUILDERS OF

Singeing, Bleaching, Mercerizing, Dyeing, Drying, Printing and Finishing Machinery

FOR

TEXTILE FABRICS AND WARPS

Plans and Estimates for Complete Plants



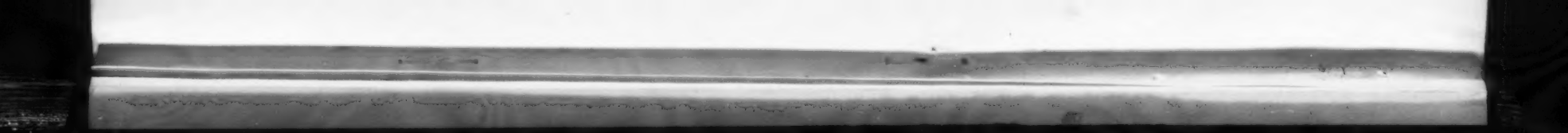
Back Dryer

ALL KINDS OF

Horizontal and Upright Drying Machines

With cylinders made from either the best English tinned iron or best Lake Superior sheet copper, fitted with our

Patent Spiral Scoops



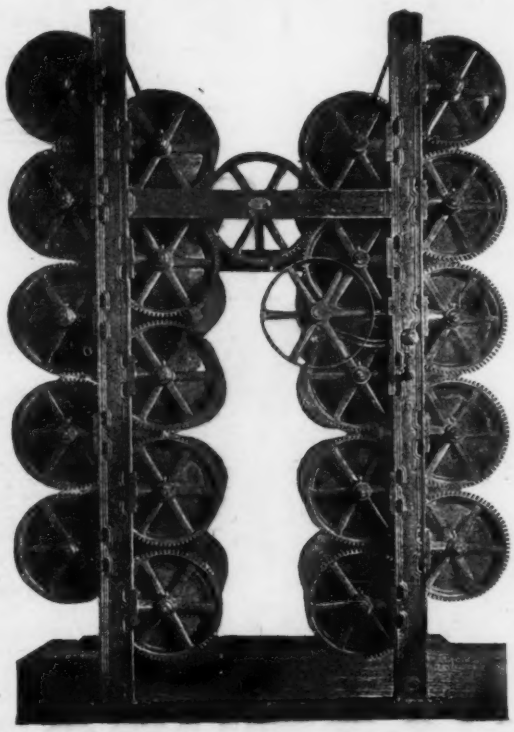
Bleaching,

Dyeing,

Drying,

Finishing,

Machinery



20-Cylinder Drying Machine

for all

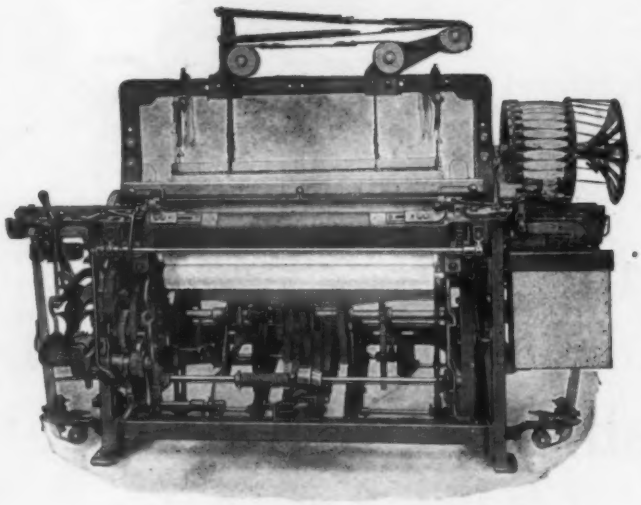
kinds of

textile fabrics

H. W. BUTTERWORTH & SONS CO.

PHILADELPHIA, PA.

PROVIDENCE OFFICE, Room 417 Industrial Trust Building



NORTHROP LOOMS

TRADE MARK REGISTERED

EARN More Wages for the Weaver
Larger Dividends for the Mill

DRAPER COMPANY

HOPEDALE, MASS.

THE MacColl Patent Spooler Guide

will, with a much more open setting, remove slubs or bunches that would pass through other spooler guides;
it will allow small piecings and knots which are unobjectionable to pass through;
it will pluck loose slubs and imperfections from the yarn without breaking, holding the slubs, etc., in the teeth until they are cleaned;
it is easily set, cleaned and adjusted;
as it works with a larger opening it requires less frequent adjusting than other guides.

On worsted yarns the production in after processes is greatly increased, as the yarn is delivered practically free from slubs and it is unnecessary to stop continually to remove these imperfections.

DRAPER COMPANY

HOPEDALE, MASS.

J. D. CLOUDMAN, Southern Agt, 40 So. Forsyth St., ATLANTA, GA.

Another recent installation

400 "Ideal" Automatic Looms

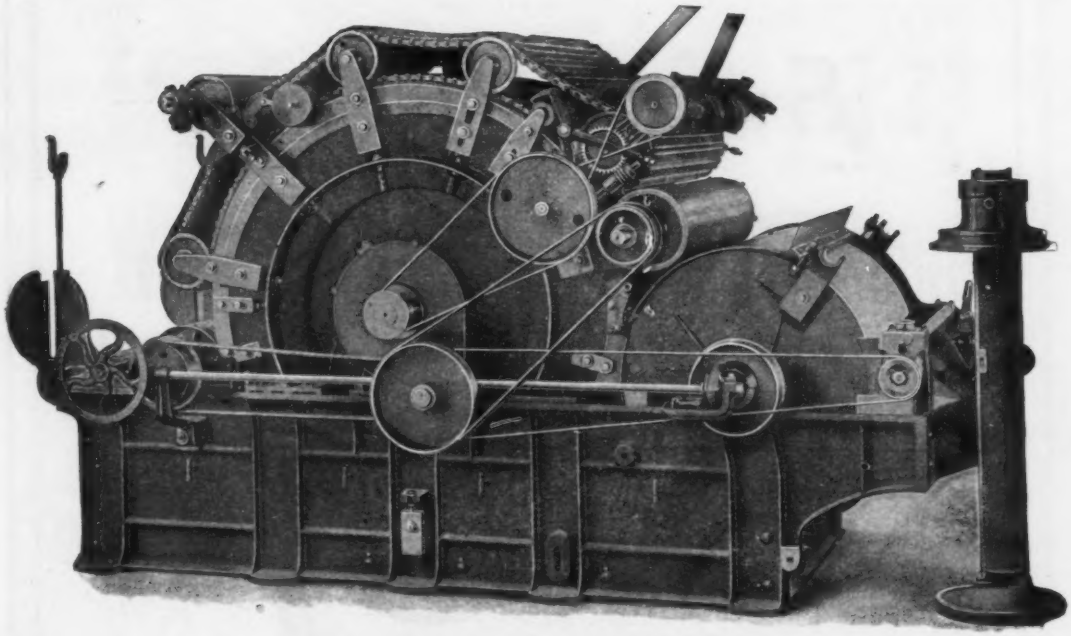
on 5 harness sateens

These looms were installed as the result of a test during which the superiority of Stafford Looms over all competitors was clearly demonstrated

THE STAFFORD COMPANY

READVILLE, MASS.

FRED H. WHITE, Southern Agent - - Charlotte, N. C.



Cotton and Worsted Machinery

With Modifications to Suit Any Class of Work.

Cotton Machinery: Cards, Railway Heads, Drawing Frames, Fly Frames, Speeders, Ring Spinning Frames, Twisters, Spoolers, Reels, Warpers, Slashers, Winders, Looms, Shearing Machines, Balling Machines, Folders, Stamping Machines, Sewing Machines, Size Pumps, Size Kettles, Drawing-in Frames, Baling Presses, Indigo Grinders.

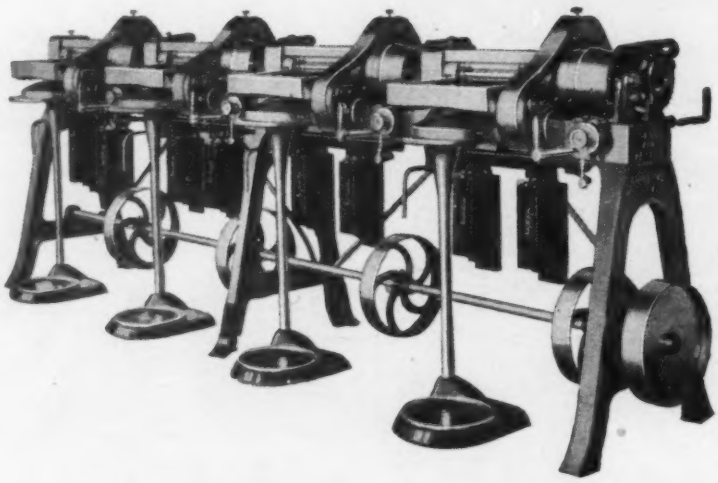
Worsted Machinery: Spinning Frames with caps, rings or flyers, Dandy Rovers and Reducers, Cone Second Finishers, Reducers and Rovers, Gill Boxes for Drawing, Preparing and Finishing, Weigh Boxes and Drawing Boxes, Cap Trap, Flyer and Ring Twisters.

Plans, Specifications and Estimates furnished upon application.

Lowell Machine Shop

LOWELL, MASS.

Saco-Pettee



Improved
Evener Drawing Frame

Simplest in Construction
Simplest to Operate
Maximum Production

Saco-Pettee Company

Shops: Newton Upper Falls, Mass., Biddeford, Me.

Southern Agent, A. H. WASHBURN, Charlotte, N. C.

"KITSON"

Waste Reclaiming Machinery

FOR REWORKING

CARD AND PICKER ROOM WASTE

Motes, Flyings, Strippings, Sweepings

THREAD WASTE

Roving Waste, Spinning Waste, Twister Waste,
Cloth Clippings, Duck Clippings, Knit Clippings

Machinery for Reworking

All Varieties of Waste

With Mixing and Conveying Systems

For Handling Reworked Stock

KITSON MACHINE SHOP

LOWELL, MASS.

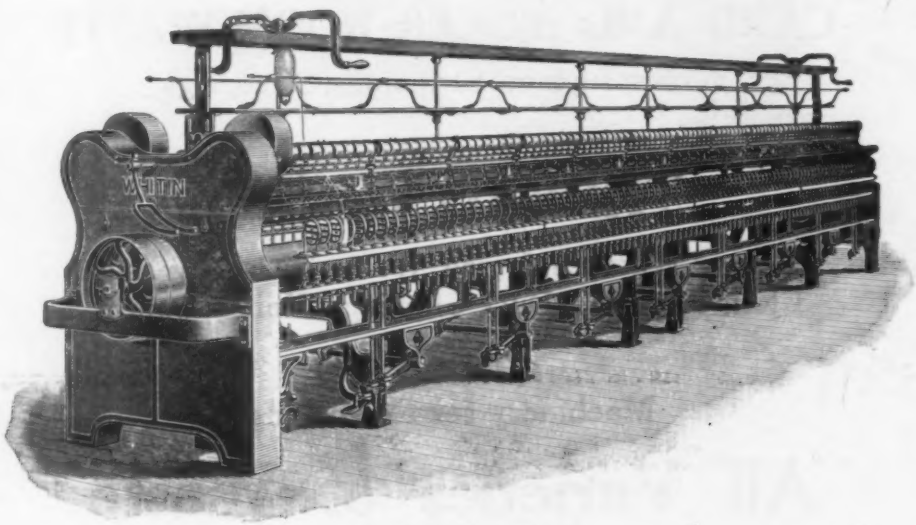
ROGERS W. DAVIS, Agent **A. H. GREEN, Selling Agent**

The Whitin Machine Works

Whitinsville, Mass.

BUILDERS OF

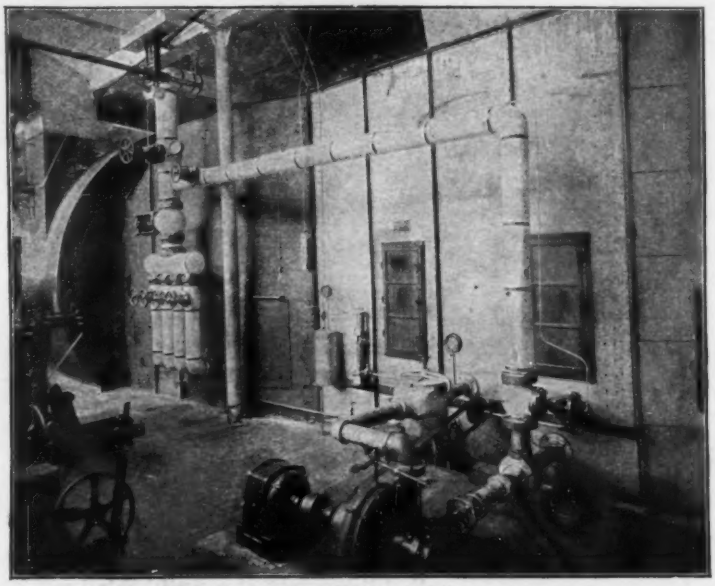
Cotton Mill Machinery



Ring Spinning Frame

CARDS
COMBERS
DRAWING FRAMES
ROVING FRAMES
SPINNING FRAMES
SPOOLERS
TWISTERS
REELS
LONG CHAIN QUILLERS
LOOMS AND DOBBIES

Southern Agent: STUART W. CRAMER, Charlotte, N. C.



Apparatus installed at Brighton Mills, Passaic, N. J.

Are You Awake to the Advantages of Equipping Your Plant with a Humidifying System?

Every department of your mill, from the Card Room to the Weave Shed, will produce a better product if your plant is properly air conditioned. In the Spinning Room you can use the same grade of stock and produce finer count yarns or you can use shorter staple stock and get the same results as you are getting now.

Results Guaranteed

Full information upon request

NEW ENGLAND
E. T. LYLE
1862 Beacon Street
Brookline, Mass.

PHILADELPHIA
E. T. MURPHY
732 Real Estate Trust Bldg.

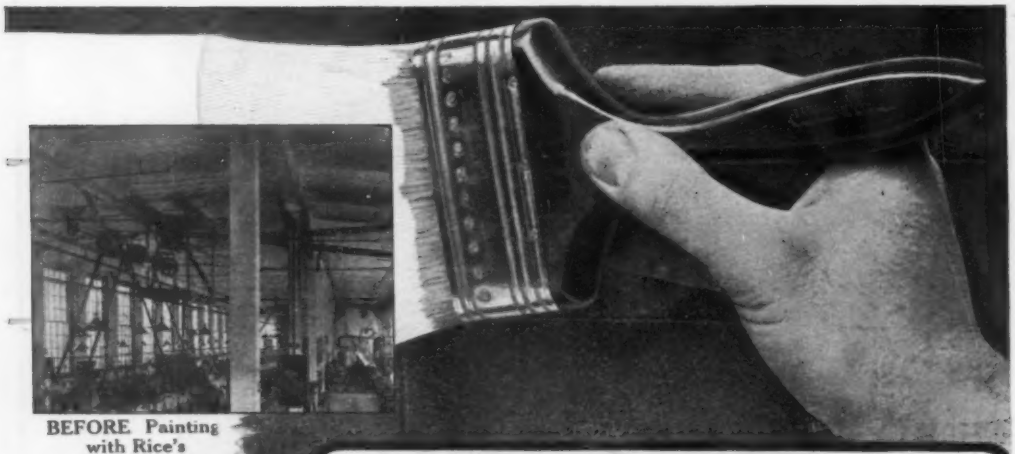
SOUTHERN
ISAAC HARDEMANN, Jr.
404 East Boulevard
Charlotte, N. C.

CARRIER AIR CONDITIONING COMPANY

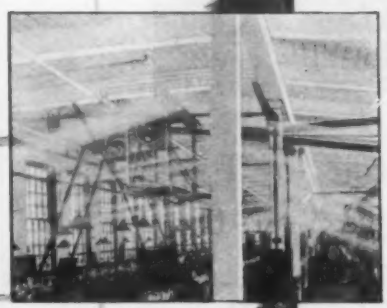
OF AMERICA

No. 39 Cortland Street, New York

173-C



BEFORE Painting with Rice's Mill White



AFTER Painting with Rice's Mill White

A Light Plant Pays Better Than a Dark One

All experience shows—other things being equal—that the output of a well lighted mill or factory is greater than that of a dark one. Light aids the individual worker—darkness hinders him. Therefore, common-sense and business forethought says, *"Let in the light!"*

There is no way of driving twilight gloom from a mill or shop interior so potent as an application of

RICE'S MILL WHITE

"The Paint That Brims Over With Sunlight"

This is the paint of the hour—the paint that more than meets expectations—the paint that pays dividends to the owner and adds to the comfort of the worker. Rice's Mill White gives a firm, yet elastic, surface that will neither scale or crack. It is sanitary. It is easily cleaned and cannot harbor dirt or germs. It spreads easily and goes far, actually covering more surface, pound for pound, than other paints. Rice's Mill White *stays* white longest—it *proves itself* alongside any competitor—it's the paint *you* need.

So that you may judge for yourself the superiority of Rice's Mill White over any other paint sold for the purpose, write us on your letter-head if you have 20,000 or more square feet of ceiling and wall space to cover, and we will send you free a sample board showing the tile-like, yet elastic, surface of Rice's Mill White, and our booklet, "More Light."

Address 20 Dudley St.

U. S. GUTTA PERCHA PAINT CO., Providence, R. I.

Originators of the Mill White Idea.

MASON MACHINE WORKS

Taunton, Mass.————Charlotte, N. C.

Improved Spinning Frame—Model B

Model B Frames Sold

NORTHERN MILLS	SPINDLES
Sagamore No. 3, Fall River	57,328
Flint No. 2, Fall River	56,512
Sharp, New Bedford	49,896
New England Cotton Yarn, Taunton	30,468
Lyman, Holyoke	31,656
Fall River Iron Works, No. 7	18,880
Shove, Fall River	12,288
Narraganaett, Fall River	11,472
Quidnick, Coventry, R. I.	12,012
Corr, Taunton	8,880
Davol, Fall River	7,344
Utica Knitting, Utica, N. Y.	5,472
SOUTHERN MILLS	
Alice, Easley, S. C.	20,840
Simpsonville, Simpsonville, S. C.	16,384
Glenwood; Easley, S. C.	20,000
Greenwood, Greenwood, S. C.	20,000
Ivanhoe, Smithfield, N. C.	12,096
Jennings, Lumberton, N. C.	10,136
Dacotah, Lexington, N. C.	9,600
Ivey, Hickory, N. C.	9,600
F. W. Poe, Greenville, S. C.	8,752
Glencoe, Columbia, S. C.	5,184
Lots under 5,000 Spindles each	12,840
Total Spindles, Model B	447,640

LEIGH & BUTLER

SUCCESSORS TO

EVAN ARTHUR LEIGH

232 Summer Street (opposite the South Station), Boston, Mass.

SOLE AGENTS

IN THE UNITED STATES AND CANADA FOR

Platt Bros. & Co., Ltd.

BY FAR THE LARGEST MAKERS IN THE WORLD OF

Cotton, Woolen and Worsted Machinery

Platt's Patent Opening and Picking Machinery.
Platt's Cotton Comber — will comb from 7-8" stock to Sea Islands.
Platt's Special Machinery for Making Cotton Waste into Yarns.
Platt's Special Machinery for Making French Worsted Yarns.
Platt's Woolen and Worsted Carding Engines, Special Designs.
Platt's Cotton, Cotton Waste, Woolen and Worsted Mules.

MATHER & PLATT, LTD.

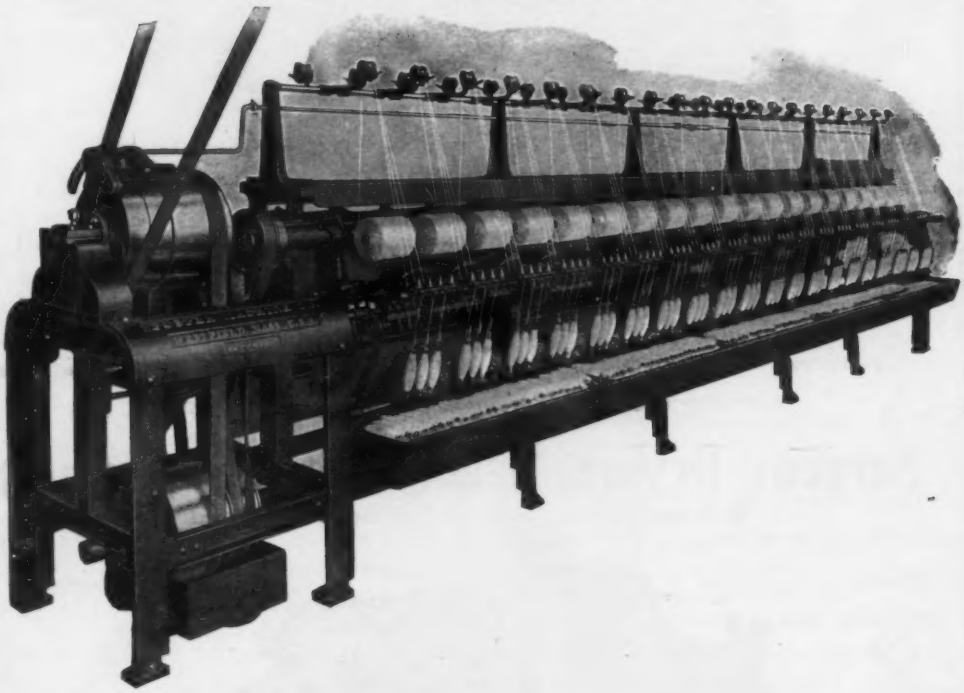
Dyeing and Finishing Machinery.
Archbutt-Deeley System for purifying and softening water.

JOSEPH SYKES BROS. Card Clothing for Cotton.
JAMES CRITCHLEY & SONS. Card Clothing for Woolen and Worsted.
WILSON BROS. BOBBIN CO. Bobbins, Shuttles, Etc.
THOMAS B. HAIGH. Double Loop Bands, Spinning Tape, Etc.
DRONSFIELD BROTHERS. Grinding Machinery and Emery Filleting.
HARDING'S Fallers, Pins and Circles.
The Best French and English Combing and Rubbing Aprons.
Card Flats reclothed and Lickers-in rewound.

There are many practical reasons why all ply yarns—cotton and worsted—should be paralleled on the

New Foster Tube Doubler

before twisting.



Some of the Reasons Are:

The paralleling is exact and the resulting twisted strand is perfect and even.

The arrangement of slub-catcher, tension and trapping device facilitates threading and lowers the cost of operation below any existing method.

The machine is designed to do one operation and to do that perfectly.

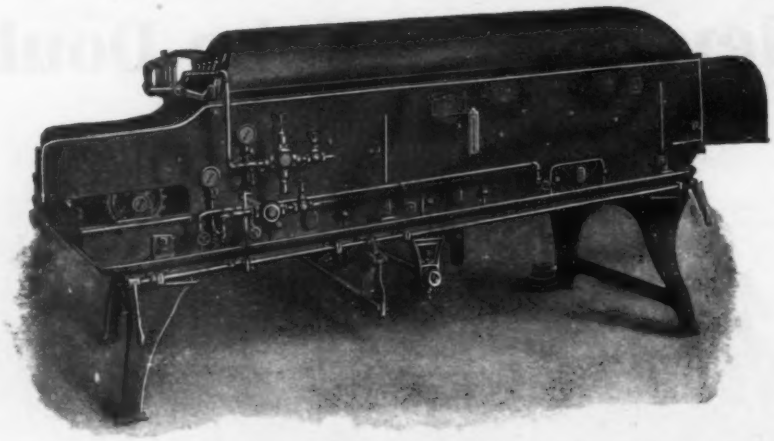
The Foster simplicity of construction assures durability.

FOSTER MACHINE COMPANY

Westfield, Massachusetts.

JOHN HILL, Southern Agent, 3rd National Bank Building, Atlanta, Ga.

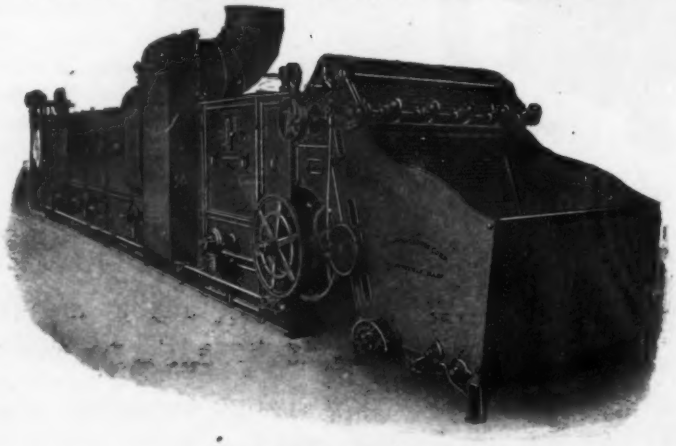
Yarn Conditioning Machine.



A Machine that Produces Results
An essential part of a modern mill equipment for uniformly conditioning yarns, without injury to bobbins
Absolutely controls the amount of moisture introduced into yarn

Sargent Drying Machines (fire resisting.)

Iron and Steel Construction, Asbestos Insulated.



For Cotton, Wool, Hair
Wool Washers, Wool Dusters and Openers
Carbonizing Dryers, Carbonizing Plants complete
Burr Pickers, Automatic Feeds for Cotton and Wool

C. G. SARGENT'S SONS, Corporation

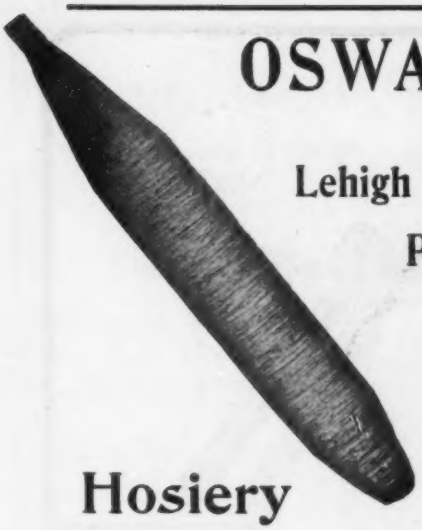
GRANITEVILLE, MASS.

OSWALD LEVER CO.

(INCORPORATED)

Lehigh Avenue and Hope Street

PHILADELPHIA, PA.



Hosiery Winders

To wind from the skein to the knitting bobbin in all sizes to suit any kind of yarn.

Cross Traverse Quillers

To wind direct from the skein or twister spool onto cops, butts, wood quills or paper tubes, to suit any grade of yarn from the coarsest of jute or duck to the finest of mercerized.

BUILDERS OF

Textile Machinery

WINDING A SPECIALTY

Upkeep Cost—Two Years=NIL

Here's the proof.

It is quoted from a letter written *by a mill superintendent*, not to us as a bouquet—but *to a mill owner* who wanted to know what the Turbo might do for him.

> "Have had the Turbo humidifier system in our mill for two years, have found it very effective. It is simple to look after, requiring very little attention and has not cost us one cent for repairs yet. We consider it the very best system."

This is but one of the hundreds of straightforward statements made by experienced textile manufacturers. They not only find the Turbo simple, economical and cheap to operate but report that it increases and improves their output, and reduces the working hours for producing the increase.

If you would like to know the names of some of these mills—some perhaps neighbors of yours—just drop us a line—we'll do the rest.

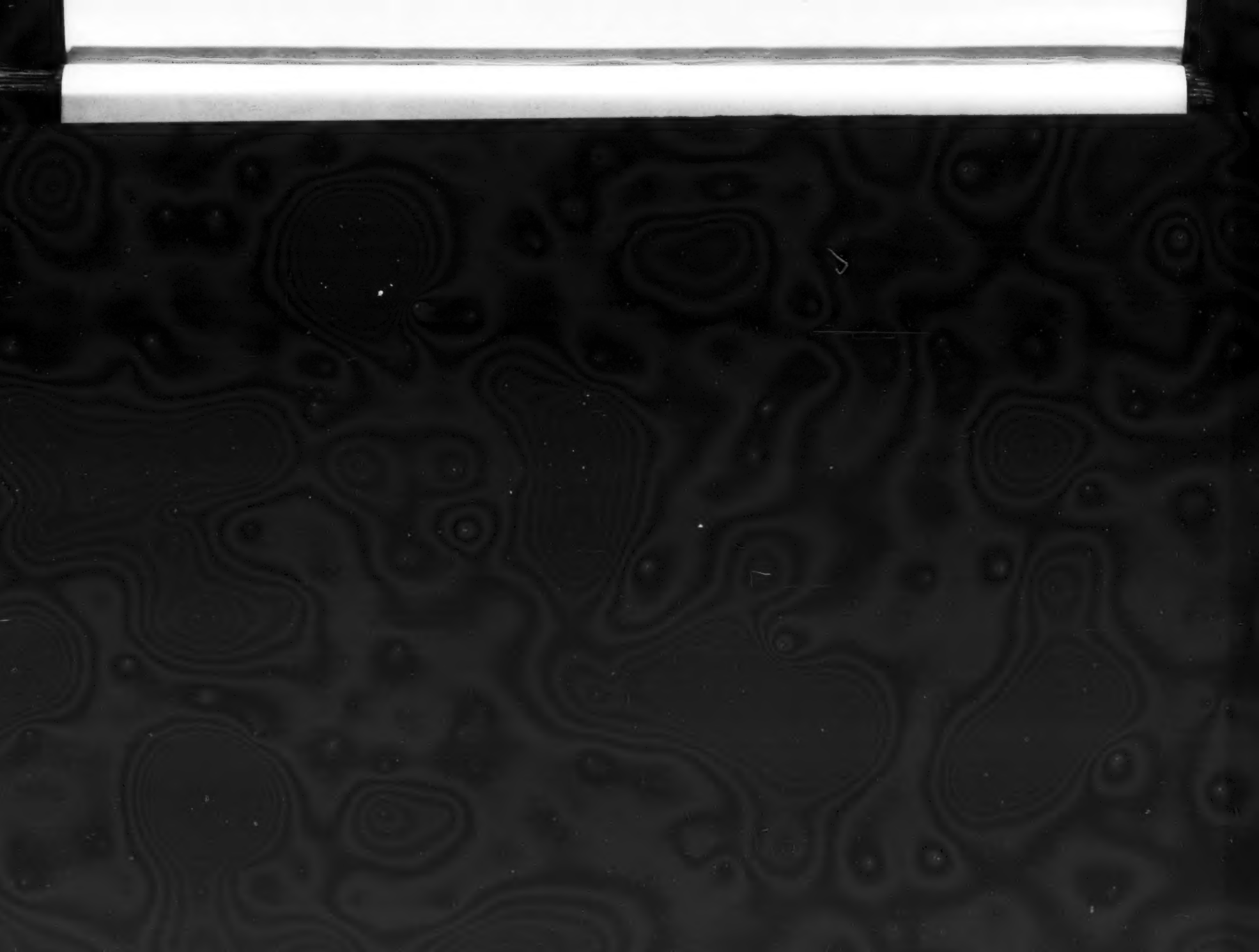
Ask also for our fact-proving Catalog.

The G. M. Parks Company

Fitchburg, Mass.

Southern Office, No. 1 Trust Bldg, Charlotte, N. C.

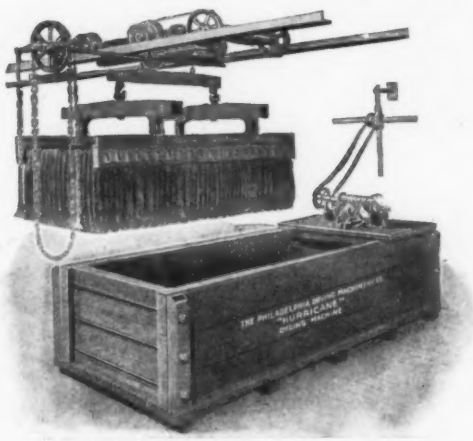
B. S. COTTRELL, Manager



The Easier, Cheaper, Better Way of Working

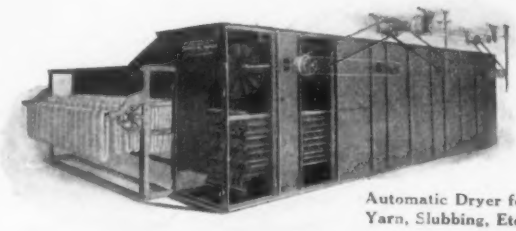
For
Skein Yarn,
Slubbing,
Hosiery, etc.

The BEST and
Most Economical
Dyeing Machine



Soon
Save
Their
Cost
BY SAVING
Labor,
Dye
Stuffs,
Steam

"Hurricane" Circulating Dyeing Machines are built in various sizes and types

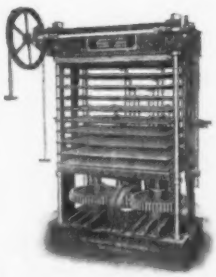


Automatic Dryer for
Yarn, Slubbing, Etc.

COMPLETE EQUIPMENTS FOR
DYEING
SCOURING
BLEACHING
CARBONIZING

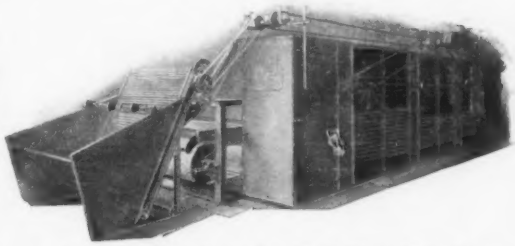
FIRE-PROOF DRYERS

Steel Construction,—Insulated with Asbestos



Power Screw / and Hydraulic / PRESSES

FANS
MOTOR
AND
BELT-DRIVEN



Automatic Dryer for Cotton Stock, Wool, Hair, Rags, Etc. Built with or without Self Feeds.

THE PHILADELPHIA DRYING MACHINERY CO.

Main Office and Works:
6721 Germantown Ave., Philadelphia, Pa.

Boston Office:
53 State Street

Now Ready

New American Edition in Two Volumes

The Chemistry and Practice of Finishing

BY BEAN AND McCLEARY

THERE is nothing in the literature of Cotton Bleaching and Finishing, excellent as much of it is, that compares with this work of Messrs. Bean and McCleary. Since the first edition was printed, leading

Bleachers and Finishers

have found that it is useful as a reference in all their work. In most of the largest mills one or more copies are in use in various departments.

Located as they are in Lancashire where the Bleaching and Finishing of Cottons is a specialized art of the highest development, and occupying the positions of foremost consulting chemist and expert practical finisher, respectively, the authors have had an unsurpassed opportunity to investigate and note the best methods.

Since the last edition was sold out, nearly two years ago, Messrs. Bean and McCleary have worked diligently on this new work. Disregarding for the time the demand from American, English and Continental manufacturers, the old edition was practically rewritten, new methods, materials and finishes were investigated, and every effort and attention devoted to securing the proper finishes with samples of fabrics.

Every characteristic type of finish is taken up and the large collection of soft and finished patterns of cloth with full particulars of the processes of finishing should be in every mill for reference purposes.

All concerns and individuals that have used the old edition will want this revised and enlarged edition in two volumes owing to the new material added. The number of copies is limited and it would be well to order early.

The price is $15.00. Express charges paid to your address.

LORD & NAGLE COMPANY, Textile Publishers

144 CONGRESS STREET, BOSTON, MASS.

THOMAS LEYLAND & CO.

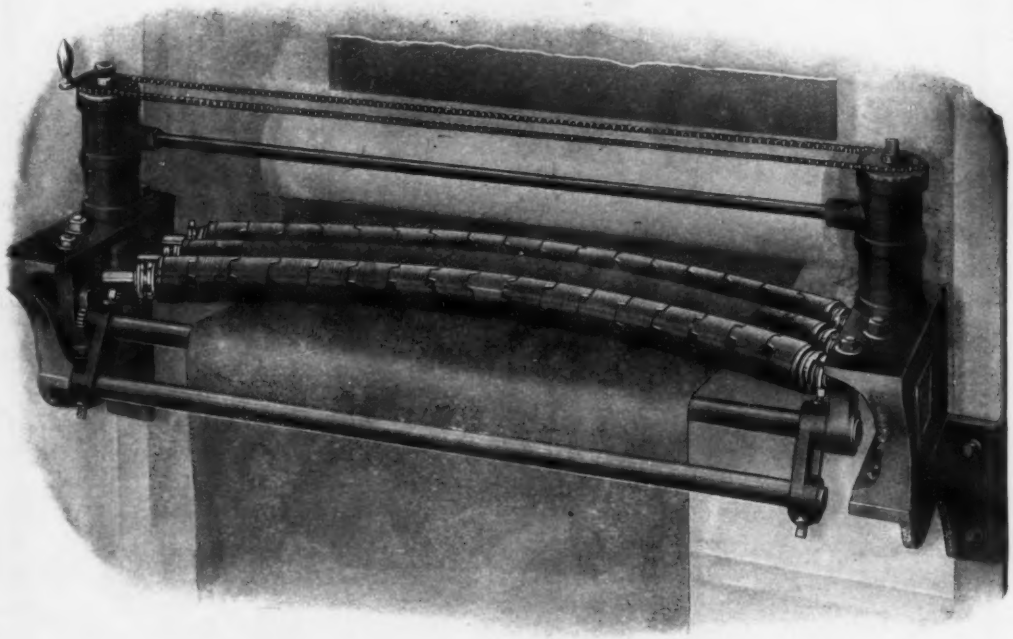
60 India Street, Boston, Mass.

F. T. WALSH, Manager

Sole Manufacturers of THE WILLIAM MYCOCK

Improved Regulating Cloth Expander

PATENTED

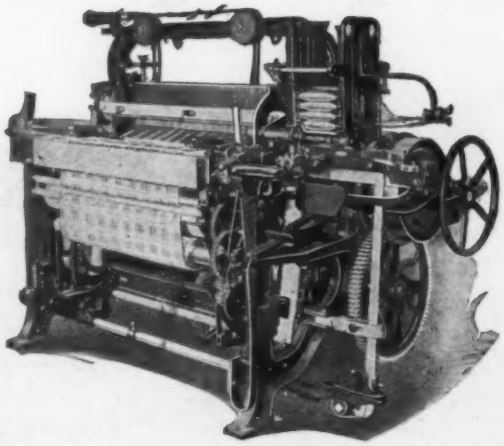


Expander attached to Calendar showing Regulating Motion and Adjustable Tension Bars

Scutchers, Sewing Machines, Open Bleaching Machines, Blanket Washers for Calico Printers, Guides, Etc.

WORKS AT READVILLE, MASS.

Crompton & Knowles Loom Works



Automatic Gingham Looms

One of our latest productions for weaving goods of two or more colors in the filling. Like every loom we build, it has the advantage of a successful mill test.

WORCESTER, MASS.

Providence, R. I. **Philadelphia, Pa.**

Southern representative, ALEXANDER & GARSED, Charlotte, N. C.

JAMES HUNTER MACHINE CO.

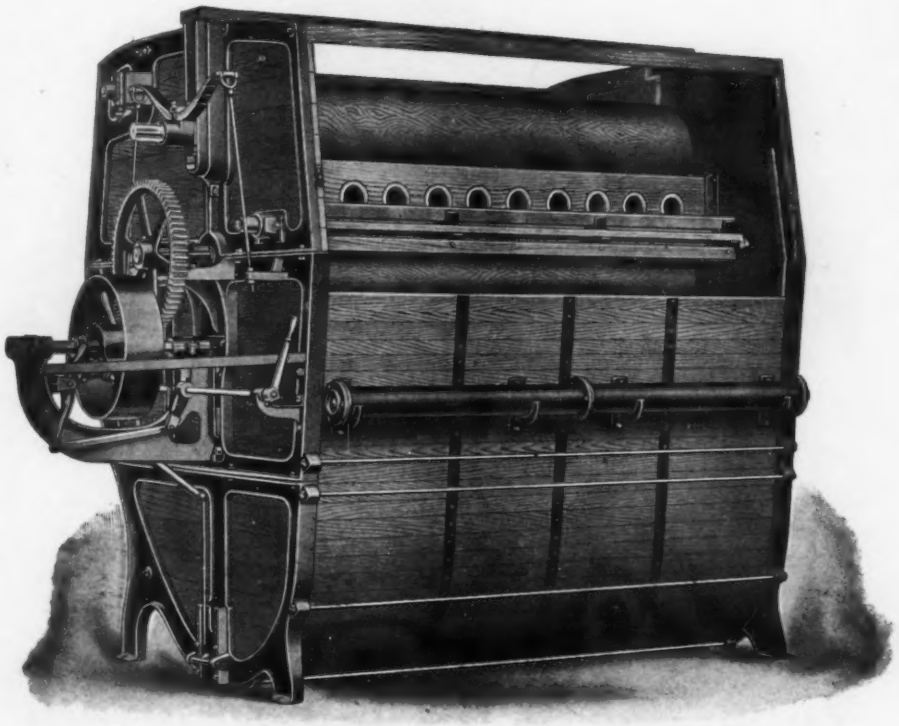
NORTH ADAMS, MASS., U. S. A.

Cloth Washer *Bulletin 51*

The Hunter

CLOTH WASHER

MODEL F



The Largest, Heaviest, Most Powerful Washer Built. For any number of strings. Get the Bulletin

COTTON MACHINERY BY SPECIALISTS

Picking and Carding Machinery

Breaker Lapper With Double Hopper Feed Regulator

Potter & Johnston

Pawtucket, R. I., U. S. A.

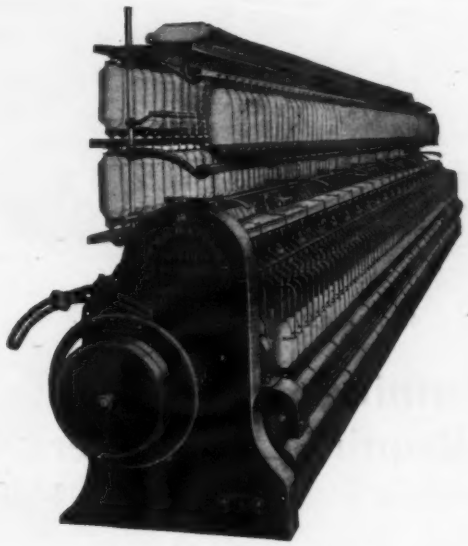
Southern Agent, J. H. MAYES, Charlotte, N. C.

COTTON MACHINERY BY SPECIALISTS

ROVING

AND

DRAWING MACHINERY



IMPROVED ROVING FRAME

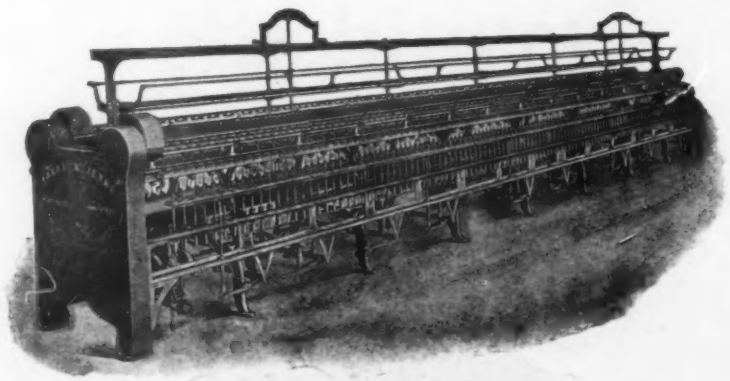
Woonsocket Machine and Press Company

WOONSOCKET, R. I.

Southern Agent, J. H. MAYES, Charlotte, N. C.

COTTON MACHINERY BY SPECIALISTS

Ring Spinning and Twisting Frames



Improved Ring Spinning Frame

Lightest Running Frames
Require Less Power
Less Cost For Upkeep

Have you seen the New Tape Drive?

Fales & Jenks Machine Co.

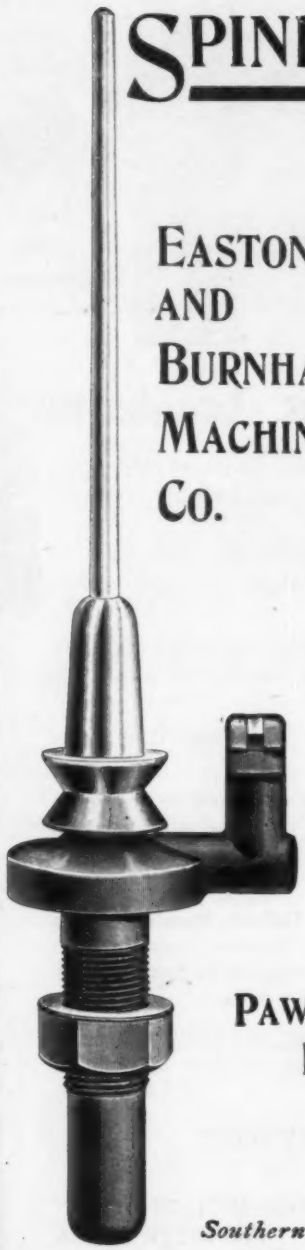
Pawtucket, R. I.

Southern Agent, J. H. MAYES, Charlotte, N. C.

COTTON MACHINERY BY SPECIALISTS

SPINDLES

EASTON AND BURNHAM MACHINE CO.



PAWTUCKET R. I.

T. C. Entwistle Co.

FRANK B. KENNEY, Pres't and Mgr.

Lowell, Mass.

Warping
Balling
and
Beaming
Machinery

OF THE

Latest and Most Improved Designs

ALSO ALL KINDS OF

Expansion Combs
for
Warpers, Beamers
and
Slashers

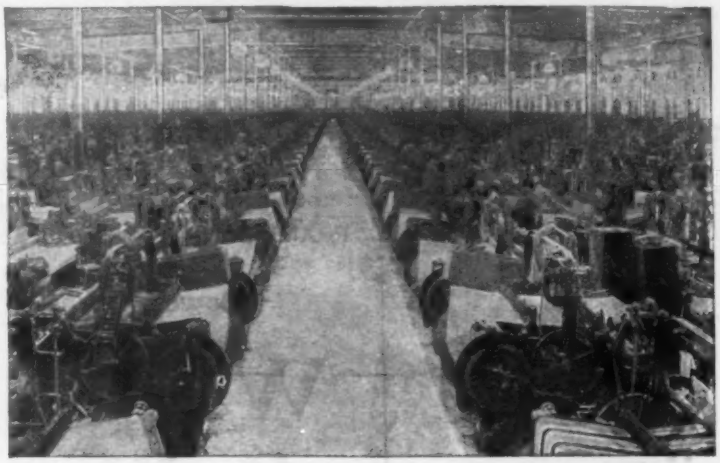
Traverse Wheel and Roll Grinders

FOR ALL MAKES OF COTTON AND WOOLEN CARDS

Southern Agent, J. H. MAYES, Charlotte, N. C.

The Guarantee of Excellence

on Good Electrical



The Symbol on Edison

His Only Rival

Mazda Lamp Cartons

Good Illumination Prevents Accidents

Poor Light Causes Accidents

500,000 avoidable accidents occur in one year says the Manfacturers' Association. 25% of these accidents, it is stated were caused by poor illumination.

Adequate illumination throughout your plant lessens the possibility of accident, not only to men but to machines also; wastage and spoilage is prevented.

Economy of Preventing Accidents

Since correct light throws no false shadows, operatives are not mislead and the danger from unsuspected pitfalls is greatly reduced.

Further, an accident completely demoralizes the shop and it is then that production drops and faults increase.

If the cost of damage, incurred by accidents were charged to the lighting bill, it would be out of all proportion to the cost of good illumination necessary to prevent them.

Edison Mazda Lamps

With Edison Mazda Lamps correctly placed you get this "accident-preventing" illumination. **Edison Mazda Lamps** give three times the light for the same current consumption as the old style carbon lamp, therefore, a great improvement in light can be made without adding to generator equipment or lighting bills.

Our lighting specialists will assist you in improving your present lighting system. Send to our nearest office for interesting booklet on "The Lighting of Textile Mills."

General Electric Company

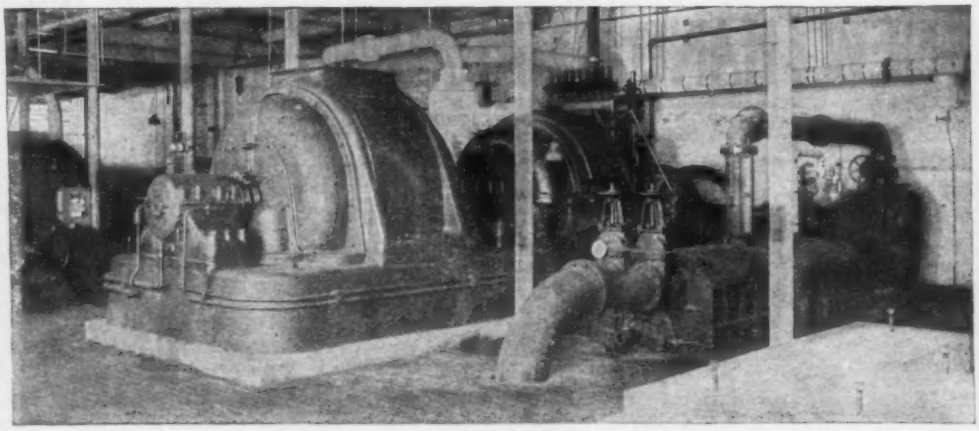
Largest Electrical Manufacturer in the World

General Office: Schenectady, N. Y.

Sales Offices in All large cities

Lamp Agencies Everywhere

3726



3000 Kw. Turbine, Tremont and Suffolk Mills, Lowell, Mass.

The World's Largest and Most Important Cotton Mills are Substituting Electricity for Steam

Curtis Turbines are generating 200,000 horse-power in eighty-six New England cotton mills. Four years ago they furnished but 41,000 horse-power to twenty cotton mills. This shows that in New England:

Curtis Turbine Power Increased Nearly 400% in Four Years

Among the mills using these turbines are the Pacific, Arlington, Tremont and Suffolk and Nashua. The American Woolen Co. is also a large user of electrical power.

With Curtis Turbines, under certain conditions, it is possible to get 40% more power from the same amount of coal, than is obtainable with the existing steam engine driven electric generators. Their operating economy is much greater than is obtainable with steam engines.

The total installed horse-power capacity of Curtis Turbines in New England cotton mills is well over 100% greater than that of their nearest competitor.

The Mill Power Department of the General Electric Company is made up of men who have installed the above and many other generators, as well as the motors through which pass 75% of all electric textile mill power used in this country. We have a specially designed motor for each textile use, a controller for every motor, and skilled engineers to apply them properly.

General Electric Company

Largest Electrical Manufacturer in the World

Mill Power Department, Boston, Mass.

General Office: Schenectady, N. Y. **District Offices in:**

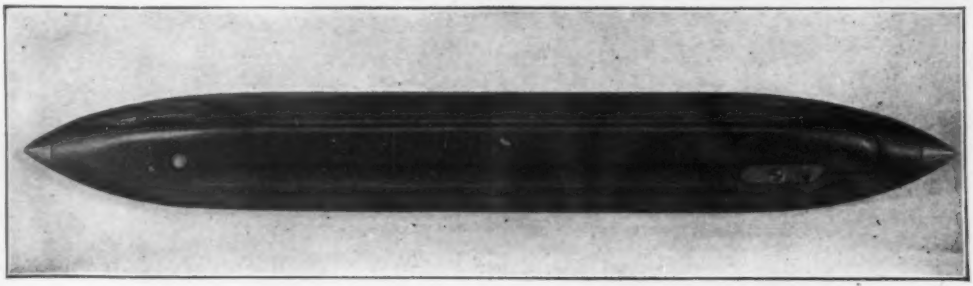
Boston, Mass. **New York, N. Y.** **Philadelphia, Pa.** **Atlanta, Ga.**
Cincinnati, Ohio **Chicago, Ill.** **Denver, Colo.** **San Francisco, Cal.**

Sales Offices in all Large Cities

3773

NEW HAND-THREADING SHUTTLE

PATENTED



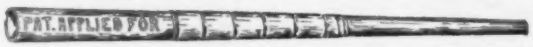
The Simplest and Most Quickly Threaded Shuttle

It can be filled with the finest silk or the coarsest filling—won't unthread when the yarn "balloons"—lint that accumulates is easily removed—felt can be inserted for tension purposes—and being a hand threading shuttle, it is sanitary.

Use Never-Slip Cop Spindles and Tubes

And Do Away With All Filling Waste

With this combination we will guarantee that you can run your looms with longer cops and at much higher rate of speed than is otherwise possible.



Never-Slip Cop Tube

Paper Cop Tubes Cones and Shells

Send Your samples and we will quote prices on any lot desired

Shuttles and Shuttle Irons

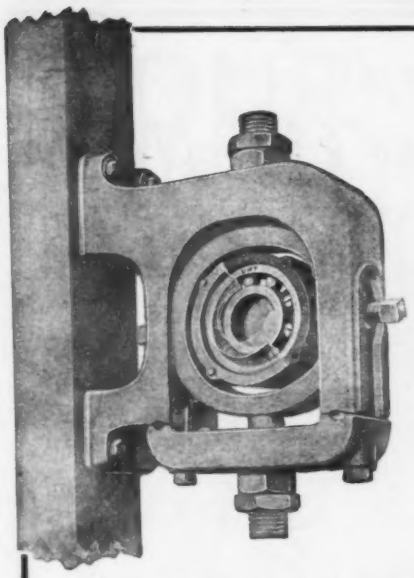
For All Textile Purposes

Trial orders solicited—Satisfaction guaranteed

American Textile Specialty Machinery Co.

670 Eddy Street - Providence, R. I.

13th St. and Boulevard, Long Island City



Here is a Parallel Case

Suppose you are making automobile engines, and need machinery for finishing several thousand pistons.

You have a big contract, and have to figure carefully on your investment in order to reserve working capital.

Turret lathes cost quite a little apiece; grinding machines cost a bunch, too. And as for jigs and fixtures—whew!

Now suppose some fellow comes along with a job lot of engine lathes which he offers for one-fifth of the price each that the turret lathes and grinders cost. A bargain, surely!

"Just think! You can slap 'em down anywhere—no trouble at all to set 'em up; anyone in the shop can do it. And you don't have to limit yourself to pistons. You can bore and face the cylinders, turn the crankshafts and flywheels, bore the connecting rods, make all the bushings, and even do most of the crank case work in these same lathes. Anyone can run them—no expert tool maker needed. And think of the price! Cheap as dirt! How can you ever expect to earn your investment on those turret lathes?"

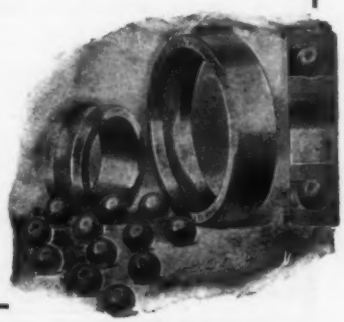
We don't need to quote your answer. We merely wish to have you point the moral when considering an equipment with

HESS-BRIGHT BALL BEARING HANGERS

Hess-Brights are neither a primitive experiment, for which the customer is asked to pay, nor a temporary makeshift. They are the most frictionless, most durable, most quiet-running, most economical anti-friction hangers ever made. They are the highest in first price, because HESS-BRIGHT BALL BEARINGS cannot be made cheaply, and because a rigid, accurately-finished, universal swivel hanger costs money to build. But they are the lowest in ***final*** cost—and the final cost is what counts.

Hess-Bright Ball Bearings are standard in all sorts of difficult high-speed and heavy duty machinery, from machine tools to turbines and from automobiles to trolley cars. We maintain an Engineering Department for the sole purpose of aiding those desirous of improving the bearing performance of their shafting or products.

We shall be glad to submit suggestions to fit your case. No charge—we ask only that they shall receive your careful consideration when made.



The Hess-Bright Manufacturing Company

27 East Erie Avenue, Philadelphia, Pa.

A Complete Line of

STARCHES AND GUMS

For All Textile Work

Our list of products contains every material needed in mill work

"GLOBE PEARL" (unchemical)

A thick boiling, strong adhesive starch for use in sizing coarse warps up to 30s. Can be recommended for finishing back filled goods, and for all work where weighting is a feature.

"FAMOUS N" (slightly alkali)

A thick boiling starch with good penetrative qualities for use on coarse warps. This starch is well adapted for colored warps. Good also for finishing back filled goods and for weighting.

"C. P. Special" WARP SIZING (unchemical)

A bolted starch for use on warps as fine as 80s. This starch has replaced Potato starch almost entirely on work from 60s to 80s and in some mills where the humidity conditions are favorable, on work as fine as 120s. This is a fine finishing starch where a very even product is especially desirable.

"500 MILL" (unchemical)

A crystal, thick boiling starch, suitable for sizing on warps up to 60s. Good penetrative powers. Used heavy makes an excellent finishing starch for heavy work on back filled goods.

"EAGLE FINISHING" (neutral)

A modified (fluid) starch for use on warps where more penetration is desirable than can be had with the very thick boiling starches. Recommended for sizing warps from 80s to 120s. Also for finishing medium weight goods where color, pliability and feel count for more than weight, yet where weight is not entirely to be overlooked.

"THIN BOILING STARCHES" (neutral)

We have a variety of thin boiling or modified starches, ranging from 20 fluidity up to 40, 50, 60, 70, 80 and 90. The thin boiling feature of the starch increases with the fluidity.

These modified starches are comparatively new in the textile field and are especially adapted for fine work, warp sizing of fine warps, or for finishing of Lawns, Cambrics, fine Ginghams, etc., where no starchy effect is desirable, save fine pliability and a soft mellow feel.

DEXTRINES AND GUMS

We also want to call your attention to the fact that we are the largest manufacturers of Dextrines and Gums (made from corn) for textile uses. These we recommend as sizings in conjunction with starch for fine work and as excellent Gums for the Printer's uses. We specially call your attention to the fact that we manufacture Dextrines and Gums from our thin boiling starches. These show great adhesive value, and used alone or with thin boiling starch make perfect sizings where silk is to be used as a filling.

If you are having any trouble with Starches or Gums, consult us — in all probability we can help you

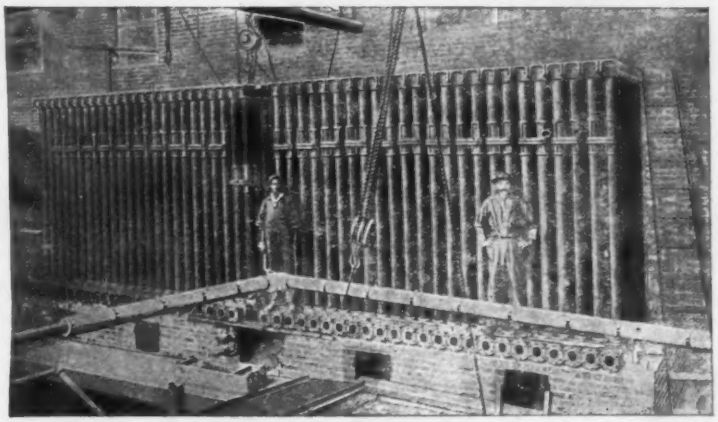
For Further Details, Prices, Etc., Address

Corn Products Refining Co.

17 Battery Place, New York

YOUR COAL BILL

Represents 95% of the Cost for Supplies



And the efficiency with which coal is used may vary from 50 to 85%; 50% in those plants where an excessive amount of air is used to burn the coal and the gases are allowed to pass to the stack at a high temperature and 85% in plants having correct firing and draft conditions and employing Green's Economizers to reduce the temperature of the gases going to the chimney to 300° F. or below.

Green's Fuel Economizer will increase the economy of a modern high-grade steam plant more than will any other improvement. The increase in efficiency from the installation of an Economizer is greater than can be expected in modern plants from better condensers, more efficient turbines, or larger boilers.

Green's Economizer represents the application of the counter-current principle to the generation of steam. Its wider use is the next step in the progress of American steam plant engineering.

Send for our BOOKLET T. W. 140, on "Economical Steam Power Plants," describing some of the largest and most efficient plants in this country, where power is being produced at an operating cost of 8c. per k. w. hour, or less.

The Green Fuel Economizer Co.

Matteawan, N. Y.

NEW YORK CITY, BOSTON, CHICAGO, ATLANTA, SAN FRANCISCO, LOS ANGELES, SEATTLE, SALT LAKE CITY, MONTREAL

Engineers; Builders of Green's Fuel Economizers, Fans, Blowers and Exhausters, Steam Air Heater Coils; Waste Air Heaters, Mechanical Draft, Heating and Ventilating and Drying Apparatus, Draft Dampers and Engines.

345

(Advertisement Continued from Aug. Issue)

Irrefutable Proof That

Otis Inclined Elevators

Cut Down the Time and Cost of Merchandise and Freight Handling

Read this letter:—it shows that Railway Freight Stations, Warehouses, Factories, Stores, Steamship Docks, Piers, etc., equipped with Otis Inclined Elevators save enormously in the Time and Cost over other methods of Merchandise and Freight Handling.

Metropolitan Steamship Company,
Union Wharf,
Boston,

Dec. 13/11

Otis Elevator Company
New York City, N.Y.

Gentlemen:-

In compliance with your letter of the 12th inst. relative to three Otis Inclined Elevators installed for us at Union Wharf in July last, I would say without hesitation that these Inclined Elevators have not only been the means of a considerable saving in the cost of handling cargo but they have made a vast improvement in the time consumed in discharging the steamers. I should say that without the Otis Inclined Elevators it would take at least 25% more time to discharge our steamers. Therefore, the difference in cost can readily be appreciated.

Yours truly
Albert Smith
Agent.

Because

ONE Otis Inclined Elevator will move MORE Merchandise or Freight in a given time than it can be moved mechanically in any other way;—or ONE MAN using the Otis Inclined Elevator can move MORE Merchandise or Freight in far less time and at far less cost than TEN or TWELVE MEN with trucks alone can handle it;—thereby lessening the cost of handling and greatly increasing the Company's capacity, business, and income.

Store, Factory and Warehouse Type of Otis Inclined Elevator

Using the Otis Inclined Elevator the man has only to load the truck, push it over to the ramp, *and the Otis Inclined Elevator does the rest.* The men with trucks and heavy loads are brought from level to level quickly, safely, and without physical effort. No time is wasted—no stops—no straining at the grade—no congestion—*the work goes on continuously.* Then as quickly as unloaded the Otis Inclined Elevator carries both men and trucks back for more freight. An electric motor is all that is required for operation and the current cost, results considered, is relatively small.

We make inclined and horizontal types adapted to every condition. You should be interested in this better, faster and cheaper method. An investigation of the type adapted to particular requirements and the money and time-saving advantages effected will surprise you. Without obligation our Engineering Department will submit plans and furnish estimate on equipment and operating cost. Write to us. Let us show you how to largely INCREASE capacity at DECREASED cost.

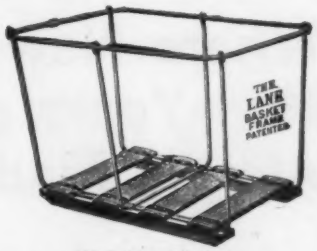
Otis Elevator Company

Eleventh Ave. and Twenty-sixth St., New York

Offices in all Principal Cities of the World

FIG. 20.
Extra heavy, best quality duck.
Leather binding.
Renewable Hardwood Shoes.

WEAR YEARS, WHERE OTHERS WEAR MONTHS



No joints at bottom.
Eye-joints at top are flexible and unbreakable.

Lane Canvas Mill Baskets Boxes and Trucks

Smooth, flexible surfaces eliminate waste and damage.
Light weight increases efficiency of help.
Long life reduces basket expense.

Are you living up to your privileges?

A STYLE FOR EVERY USE
WRITE FOR CATALOG

FIG. 22.
Frame of round spring steel with flexible Eyejoints.

Manufactured by

W. T. LANE & BRO.

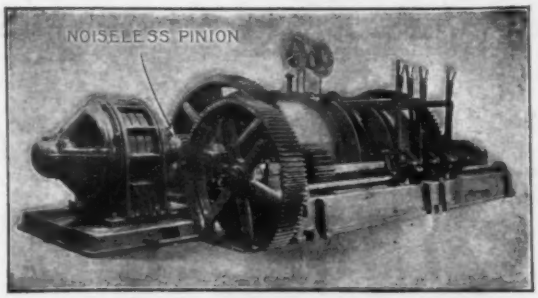
OFFICE AND WORKS

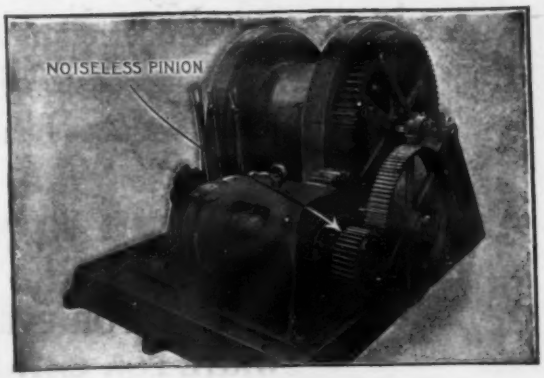
POUGHKEEPSIE, N. Y.

FIG. 27
Mounted regularly as shown, with Improved Thread Guard wheels. Also furnished on swivel casters, if desired.

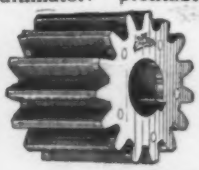
Where New Process Pinions Have Had Years of Service and Always Made Good.

Every little design detail in the machinery built by The Denver (Col.) Engineering Works Co. is as good as can be made by experienced engineers who are satisfied only with the best. Hence the continued use of New Process Noiseless Pinions on the motor drive of many types of their electric hoists is significant. The performance and durability of these pinions under conditions more severe than on textile mill machinery has been demonstrated here beyond question. Invariably the drives equipped with New Process Pinions have done their work well and the Denver Engineering Works Co. tells us, "*We have found rawhide gears as furnished by the New Process Raw Hide Co. to be more satisfactory than any others we have tried.*"





Silence and absence of vibration on any geared motor drive as accomplished by New Process Noiseless Pinions are highly desirable and ultimately profitable in numerous ways. Employees do better work and make fewer mistakes in quiet surroundings. Machines are greatly benefited and the life of delicate parts lengthened where there is no jar or vibration incident to gear tooth contacts. This subject is certainly worth investigating. Our literature and engineers' advice are yours for the asking.



NEW PROCESS IS TO ALL OTHER RAWHIDE AS STEEL IS TO IRON

The NEW PROCESS N.P.R.H. RAW HIDE Co.

OFFICE & WORKS SYRACUSE, N.Y.

REG. U.S. PAT. OFF.

FOR

VELVETS

Our latest MONFORTS

Plush Pile Splitting Machine

and

Monforts Ball Bearing Nappers

Monforts new cloth cleaning emery machine
double acting on both sides of goods

Hank Mercerizing Machine

new patented process for more lustre and
fuller yarn

EGYPTIAN COTTON

CHINA COTTON
AMERICAN COTTON

L. H. A. SCHWARTZ & CO.

40 Central Street **Boston, Mass.**

Save Money On Outside Paints

You can—and get a better paint too—

The ordinary, ready-mixed, one-pigment paint for outside use soon fades, cracks, peels, checks, or chalks.

It won't last—

You don't get your money's worth—

What you want—and should get—

Is the four-pigment paint, that is,

Rice's Reinforced Paint

"The Paint That Neither Cracks Nor Peels"

It is a scientifically proportioned blend, mixed by modern machinery and divided this way:

75% { One pigment, viz: Sublimed White Lead—the finest exterior pigment known.

25% { Zinc White, Blanc Fixe, and Asbestine—that is, three pigments not found in ordinary hand-mixed paints.

The sum total=100%=paint satisfaction

For these three extra pigments, found only in **Rice's Reinforced Paint**, give it maximum wearing quality; fill the voids; increase the "tooth" and body; reinforce and multiply the strength of the fundamental pigment—white lead.

The result is the most economical, most satisfactory outside paint for mills—or other outside uses.

The extra pigments do it—they save money for you.

Proof of these claims, Color Chart and prices sent on request—without obligating you in any way.

Ask for them—save on your outside paint.

Address all letters to 20 Dudley St.

RICE'S Reinforced PAINT

RICE'S Reinforced PAINT

U. S. GUTTA PERCHA PAINT CO.

PROVIDENCE, R.I.

SMITH, DRUM & CO.

"BUILDERS OF THE BEST"

Labor Saving Machinery for Dyeing, Singeing and Finishing

HOSIERY

IN SULPHUR, ANILINE, DEVELOPED BLACKS AND COLORS
POWER SCREW PRESSES and MERCERIZING MACHINES

SAVE LABOR and DYE STUFF and do BETTER WORK
in your dye house by using

Smith, Drum & Co. Machines

Full Particulars on Application

Coral and
Cumberland Streets,
Philadelphia,
Pa.

Southern Agent
H. G. MAYER
Realty Bldg.,
CHARLOTTE, N. C.

LAWSONS

Hope Foundry, LEEDS, England

BRANCH OF

Fairbairn Lawson Combe Barbour, Ltd.

MAKERS OF MACHINERY FOR

Preparing and Spinning

Flax, Hemp, Tow and Jute

Special Machinery
for the Manufacture of
Twines, Rope Yarns and Binder Twine

Good's Combined Hackling and Spreading Machine.

Long Reach Screw-Gill Drawing Frames. Chain-Gill Drawing Frames with Apron Heads.

Patent High-Speed Horizontal and Automatic Spinning Frames for Manila.

Improved Laying Machines.

Haskell-Dawes Tubing Twisters.

Brownell's Patent Twisting and Laying Machines for Twine.

N. B.—Complete Plans and Estimates for Flax, Tow, Hemp and Jute Mills, Trawl Twine Factories and Steam Ropeworks.

UP TO THE MINUTE

Wool and Worsted Top Dying

IN THE

PSARSKI DYEING MACHINE

PRACTICAL—ECONOMICAL—THOROUGH

UNIFORM COLOR

Dyes Wool and Tops—100 per cent. of Batch—absolutely level color throughout

NO FELTING

The Mass—Dormant While Dyeing—Cannot be Felted. Fibre comes out as Alive—Soft—Elastic and Spinable as it was Before Dyeing

DYES LOOSE WOOL		DYES TOPS	
Acid Colors	2,000 pounds per day	Fine Wool	500 pounds per batch
Top Chromed Colors	1,500 " "	Coarse Wool	800 " "
Bottom Chromed Colors	1,000 " "		

THREE BATCHES PER ELEVEN HOUR DAY

Tops are packed rapidly and easily. No special system or building. Tops are dyed uniform color throughout

NO FELTING—NO RE-COMBING—NO ADDITIONAL NOILS

SAVES 5 TO 10c PER POUND OVER OTHER MACHINES

SAVES 90 PER CENT. STEAM OVER HAND KETTLE OR REVOLVING MACHINES. SAVES DYES—LABOR—WATER

IS SIMPLE—STRONG—COMPACT—DURABLE—PRACTICALLY NEVER NEEDS REPAIRS

THE PSARSKI DYEING MACHINE COMPANY

3167 Fulton Road CLEVELAND, OHIO

Cloth Washers, Dye Tubs, Vats, Fulling Mills,
Piece Dyeing Machines, Special Machinery,
Brass Founders, Tanks, To Order.

Hopkins Machine Works, Inc.

BRIDGETON, R. I.

Providence Office, 49 Westminster St.

Spindles and Flyers, for Cotton, Wool, Silk, Flax, etc.

Send for our latest Catalogue and Price List

Dye Tub Valves, Cloth Guides, etc. Bronze or Porcelain Rings.

WATER-PROOF

Neptune Belting Satisfies

It is tough, yet flexible, and will last longer, by far, than ordinary belting when used in dry places.

Neptune Belting can be treated "shamefully"—it can be left indoors or outdoors, cold, snow or ice, in the hot, dry sun or wet rain.

It will stand the test every time—the laps won't loosen—that we guarantee absolutely.

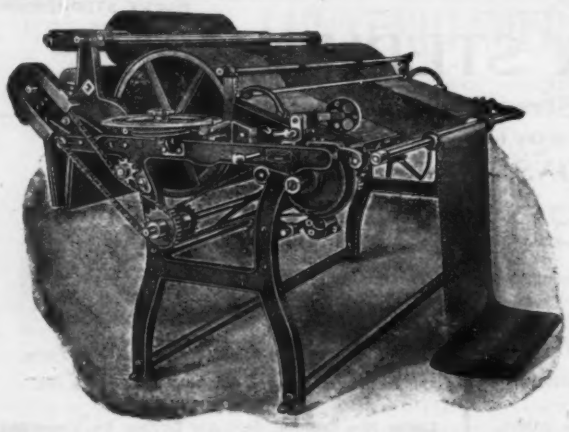
Send for Neptune Booklet No. 4—it tells some wonderful experiences—it is convincing and should be in the hands of every belt user.

The Graton & Knight Mfg. Co., Worcester, Mass.

BRANCHES: Atlanta, Boston, Cleveland, Chicago, Detroit, Kansas City, Mo., Milwaukee, Minneapolis, New York, Philadelphia, Pittsburg, Portland, Ore., San Francisco, Seattle, St. Louis

Selling Agents for Texas
THE GRATON & KNIGHT MFG. CO. of Texas, Dallas, Texas

Neptune is but one of the G & K belts. We have belting for every mill need.



Trademarking and Yardnumbering Measurer

You have got to measure your goods.

Why not in the same operation stamp the yardage in clear consecutive figures exactly 36 inches apart?

It costs practically nothing.

Shortage claims will stop like turning off an electric light, and the whole machine is paid for in twelve months by its savings.

Why not trademark at the same time?

No added cost.

A clean, white imprint on every yard identifies your cloth and makes your business grow.

Parks & Woolson Machine Co Springfield Vermont

Cut Your Labor Cost in Two

BY USING THIS

Undercut Cloth Cutting Machine

FOR SAMPLES AND PINKING

This Is the Only Undercut Machine Made

If you send out many samples, you should economize by getting this low-priced machine.

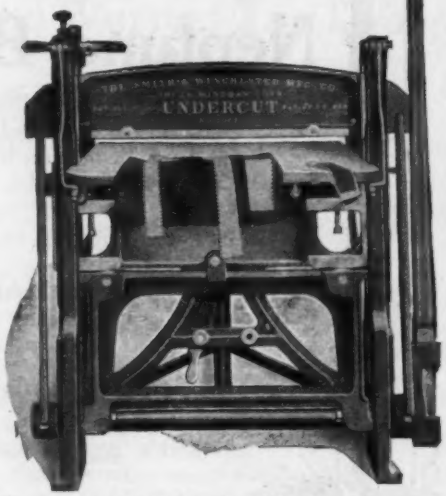
It will do double the work of the old style cutter.

It cuts straight or pinked edges with equal perfection.

It is easy to operate and there is no danger in its use.

It is very simply constructed—nothing to get out of order.

It saves money—because it clamps, cuts and unclamps the goods—all with one operation.



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SPEED & STEPHENSON,

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Including Gill Boxes, Drawing, Roving, Spinning, Twisting and Yarn Finishing Machinery.

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Wool Washing and Carbonizing Machines.

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Improved Worsted Cards and Mules, Duplex Woolen Cards with Josephy Tape Condensers, to take off up to 240 ends. Improved Woolen Mules, Fearnaughts, etc.

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MILL SUPPIES Roller Leather, Combing Aprons, Bristles, and all Supplies used in a Worsted Mill.

MACHINE SHOP AT LAWRENCE, MASS., For Repairs, Change Gears and Parts.

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The Ideal Insulator for High Pressure Pipes

Made up in laminated form, like the leaves of a book, J-M Asbesto-Sponge Felted Pipe Covering confines a large number of small particles of dead air between the layers. Thus maximum insulating efficiency is secured. The layers consist of thin felts composed of pure Asbestos fibres and finely ground sponge, forming a real cellular fabric. J-M Asbesto-Sponge Felted Pipe Covering is tough, yet flexible, and is practically everlasting. It can be removed and replaced as often as required, without injuring its efficiency. For high pressure and superheated steam pipes it has been proved by years of severe testing to be without an equal as an insulator.

Write nearest Branch for Sample and Catalog No. 100

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Manufacturers of Asbestos and Magnesia Products — ASBESTOS — **Asbestos Roofings, Packings, Electrical Supplies, Etc.**

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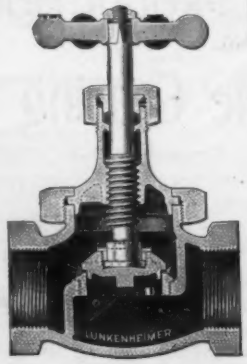

LUNKENHEIMER "RENEWO" VALVES

Let the purchase of your valves be governed by "QUALITY"; carefully consider durability and practicability; compare the "Renewo" with other makes of valves, and we feel satisfied as to your choice.

Lunkenheimer "Renewo" Valves are durable because every part can be renewed, which includes the seat and disc. The seating faces are regrindable, without removing the valves from their connecting pipes.

The material used for the body and trimmings, with the exception of the seat and disc, is of the very highest grade, the bronze containing a large percentage of copper and tin. The seat and disc are made of a most durable nickel alloy.

The valves are made in Medium and Extra Heavy Patterns, guaranteed for working pressures up to 200 and 300 pounds per square inch respectively, and in sizes ranging from ¼ to 3 inches inclusive.

"MOST supply houses sell them--yours CAN--if they DONT or WONT,--tell US"

Write for 1912 catalogue.

THE LUNKENHEIMER COMPANY,

Largest Manufacturers of High Grade Engineering Specialties in the World.

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New York,	Chicago,	Boston,	London, S. E.
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CAN YOU PILE THIS BY HAND?

1200 LB. BALES PILED 18 FT. HIGH

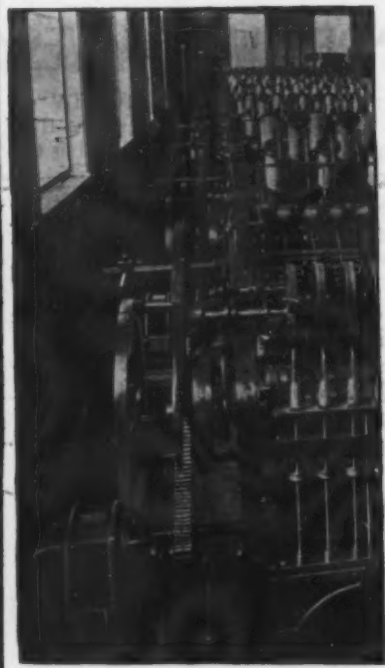
PERHAPS five or six men could get the bale to the top of the pile, but they would have to pull and shove to do it. It would take three times as long, and five times as much labor, as to raise it with the

ECONOMY STEEL TIERING MACHINE

Nor would the stock be kept in as good condition. This same warehouse before the machine was purchased was a sharp contrast to its present condition. This user proved he could cut the cost of labor and handle his goods better by machine. So can you. Let us send a little booklet which tells about it.

Economy Engineering Company

415 S. Washtenaw Ave., Chicago, Ill.



INCREASE YOUR PRODUCTION

BY USING

Morse Flexible Gearing

This form of transmission is **Durable, Silent, Highly Efficient,** provides a **Positive** speed ratio and runs with a **Minimum** amount of care and attention.

The installation of the spinning frame drives shown here **Increased the Production** in this room by keeping the cylinder shafts absolutely up to speed at all times.

The service obtained from these **Morse Silent Chains** was upwards of **12,000 Hours. No other form of Transmission** has ever approached this record in connection with the individual motor equipment.

We now have in successful operation drives transmitting an aggregate of over 500,000 H. P. Individual drives running from 1 H. P. to 2000 H. P. each.

Let us figure on some of your power transmission problems.

Our Bulletin No. 9B is particularly interesting.

MORSE CHAIN CO, Ithaca, N.Y.

N. E. Branch, 141 Milk St., Boston

Westinghouse Service for Textile Machine Users

THE Westinghouse Electric & Manufacturing Co. is vitally interested in having all users of textile machines driven by Westinghouse motors obtain from them the greatest possible production and consequently the lowest cost per unit.

Individual motor driven textile machines, properly applied and used in accordance with the purpose of their design, do show a large increase in production and a finer quality of work as compared with machines driven by other means. If you are not obtaining such results, your machines can be arranged to obtain them and we shall be glad to cooperate with you to this end.

The Westinghouse Company maintains a corps of experts who are thoroughly familiar with the results that should be obtained from motor driven textile machines; their services are at your disposal. Therefore if you desire to have existing equipments investigated, or if you wish to know the possibilities that may be realized from machines which are not now motor driven, we shall be glad to make the investigations for you. This is part of the service which the Westinghouse Company renders its customers.

Address correspondence to Dept. 70

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.

Don't Build a New Warehouse
Get a Revolvator

Note how compactly a Revolvator stows bales in this warehouse.

If you are cramped for storage room, a Revolvator will enable you to get anywhere from half again to twice as much material in your present warehouse, as it enables you to decrease the width of aisles, utilize space near the ceiling often wasted, or if you so desire, stack the warehouse entirely solid as shown in the accompanying photograph. These advantages are due to our revolving base feature, which enables you to unload this tiering machine in the rear or on any side.

If you want to reduce freight handling costs, increase storage room capacity, and find out why the Revolvator is at least 100% more efficient than any other tiering machine on the market, write for a copy of our book, W, "Scientific Tiering."

New York Revolving Portable Elevator Co.

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Six Dollars for Repairs in Fourteen Months

The first KisselKar Truck sold to the American Woolen Company for the use of the Ayer Mills at Lawrence, Mass., ran fourteen months with a repair bill of $6.

This KisselKar Truck traveled in the period named a little more than 15,000 miles on the same set of tires.

The driver was taken from the company's yards without previous experience and placed in charge of the truck after one week's instruction.

"The results obtained have been entirely satisfactory," writes Mr. D. L. Lawson of the Ayer Mills.

KISSELKAR TRUCKS

1500 lbs.-1-2-3-4 and 5 Tons

Note these striking KisselKar merits:

Simple engine - easy to operate—reserve power—excess capacity—differential lock preventing one drive wheel absorbing all the power on slippery places, and stalling the truck—four speed transmission geared up—fourth speed permitting high speed without racing engine: 15% to 20% lower fuel consumption than average trucks—light spring suspension for power plant—heavy spring suspension for load - gauge that weighs load—greatest accessibility—easy control—larger brake drums, and extra powerful brakes—special bodies designed to meet every need.

At the disposal of KisselKar owners is the unrivaled KisselKar Service, consisting of completely equipped service buildings at leading centers, where the mechanical end of motor trucks is taken off your hands.

Ask us to analyze your present horse haulage as compared to motor haulage. The result will be interesting.

Send for free book showing KisselKar Trucks in actual use in yours and many other lines of business.

Kissel Motor Car Co., 528 Kissel Ave., Hartford, Wis.

Branches: New York, St. Louis, Minneapolis, Chicago, Milwaukee, Los Angeles, Dallas, Boston, St. Paul, Kansas City

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will protect all concrete or cement construction against damage by moisture, will retard fire, give your building any tint desired, may be used as a tint on brick or wood, is equally advantageous on stucco or concrete houses, in mill, bridge or sewer construction. Send at once for booklet No. 17.

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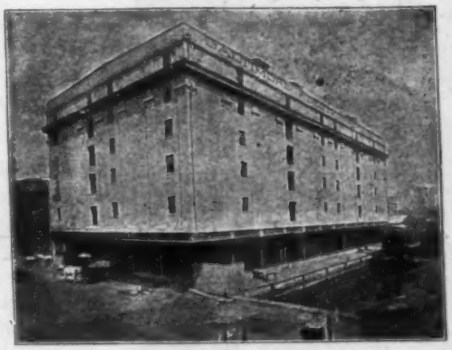

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Bay State Cement Coating used on Interior Walls

Wadsworth, Howland & Co., Inc.

Paint and Varnish Makers and Lead Corroders

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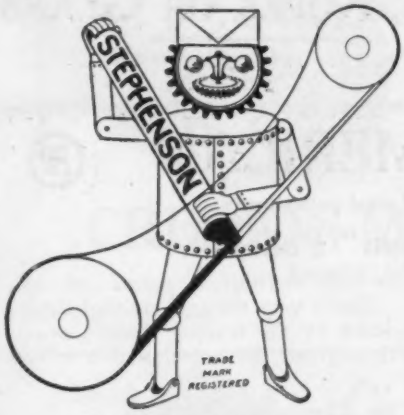
STEPHENSON

Bar Belt Dressing Prevents

Waste of Power and Fuel

Because it stops the belt from slipping and causes it to transmit all the Power without being made so tight as to cause unnecessary friction.



This Registered Trademark Is Your Protection

It appears on each stick of Genuine Stephenson Bar Belt Dressing—the dressing that has held to its uniform quality for 23 years.

This belt dressing surpasses liquid preparations, for there is absolutely no waste in applying it to the belt, and it is put up in sticks or solid form, so that it can be carried about in the tool-box. For these reasons—

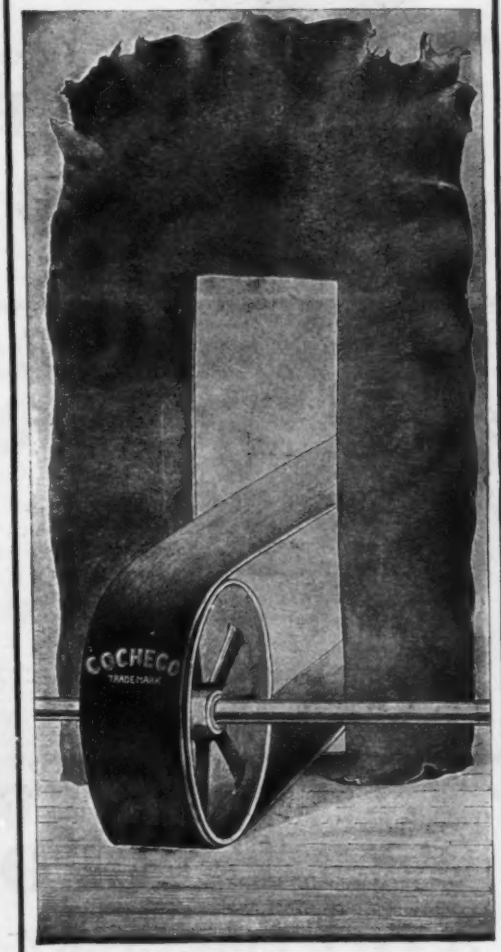
1 Pound Lasts as Long as 2 Pounds of Any Liquid or Semi-Liquid Dressing.

There are two brands, Red Label for leather belts, Green Label for rubber, canvas, or balata belts.

Prices, literature and sample sent to any mill on request.

Stephenson Mfg. Co.
Main Office and Works,
Albany, N. Y.

Explaining the Quality of COCHECO BELTING



It is cut from the centre of the butt—every inch of it the highest quality obtainable. It is strong, short lap and heavy weight, and free from shoulder or belly leather. Belting experts, backed by 70 years of cumulative experience, make it.

It is sold on a money back-if-not-as-represented basis.

If you seek real belting economy, write for catalog and prices.

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DOVER, N. H.

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Latest and most approved methods of

POWER TRANSMISSION
by
BELTS, ROPES, OR GEARS

Write for full information

PATENTED

THE AMERICAN

The first all steel pulley made.

"American" Pulleys

have never been equalled in their meritorious points—design, strength, truth, efficiency. That's why they have the largest sale. They are carried in stock by the leading dealers everywhere, and their wide sale throughout the world is due to one thing—SUPERIORITY.

Write now for illustrated catalog.

Every Pulley Guaranteed

THE AMERICAN PULLEY COMPANY
OFFICE AND WORKS: PHILADELPHIA, PA.
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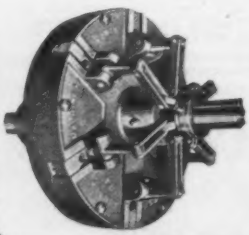
The Hunter **Friction Clutches**

A TYPE FOR EVERY DUTY

SPECIAL CLUTCHES TO YOUR NEEDS

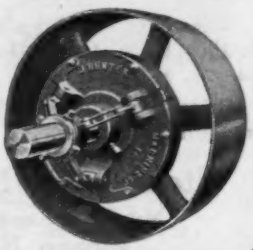
Let Us Solve Your Problems



"That's Our Business"

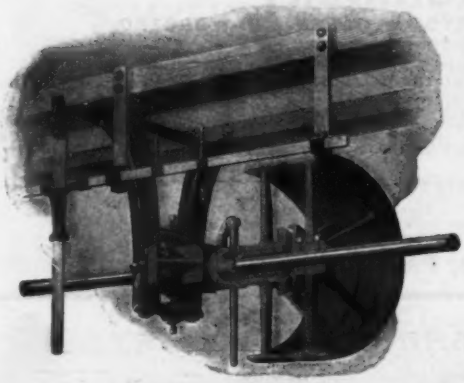
James Hunter Machine Co.
70 KILBY STREET, BOSTON, MASS. and NORTH ADAMS, MASS.

Send for "Clutch Bulletins"



A Power Saving Pulley Arrangement

The annoyance, power-waste and expense of running loose pulleys when machinery is not in use is entirely eliminated in plants which use



"Cresson Quality" Patent Loose Pulley Arrangement

This ideal arrangement saves power, belting, oil, wear on loose pulleys and shafts—also saves time and labor. The loose pulleys last a life time—when machinery in operation stops, all attention and expense stops automatically—line shaft is relieved of strain.

Write us for details—let us help you on your power transmission problems—our fifty years of experience is at your service.

CRESSON-MORRIS COMPANY

ENGINEERS—FOUNDERS—MACHINISTS

Philadelphia, Pa. **New York, 90 West Street**

Goulds Double Suction Single Stage Centrifugal Pumps

For General Service in the Textile Mill-Heads up to 150 feet

These pumps require the minimum space for installation and operate with practically no attention.

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OF EVERY DESCRIPTION FOR COTTON, WOOLEN AND WORSTED.

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Pick Classes, Leather Aprons, Patent Wire Chain Aprons.

BIRCH COTTON FINISHING MACHINERY

Scutchers	Washing	Sewing
Angular Guides	Dyeing	Singeing
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THE BIRCH WOOLEN WORSTED FINISHING MACHINERY

Crabbing	Steam Finishing	Cloth Openers
Piece Dyeing	Steam Blowing	Folders
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BIRCH BROTHERS

ALBERT BIRCH, Textile Mechanician.

SOMERVILLE MACHINE WORKS, SOMERVILLE, MASS.

RELIANCE CLOTH HANGING MACHINE

For shrinking woolen, worsted and cotton goods; drying oilcloth, or waterproof cloth, and curing rubberized cloth.

Can be attached to any machine or operated separately

In use by the United States Quartermaster department for shrinking uniform cloth.

Write for catalogue and prices

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Frankford, Phila.

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American Moistening Company

120 FRANKLIN STREET, BOSTON, MASS.

Received the HIGHEST AWARD on recommendation of the FRANKLIN INSTITUTE for

"SIMPLICITY AND ORIGINALITY OF DESIGN."

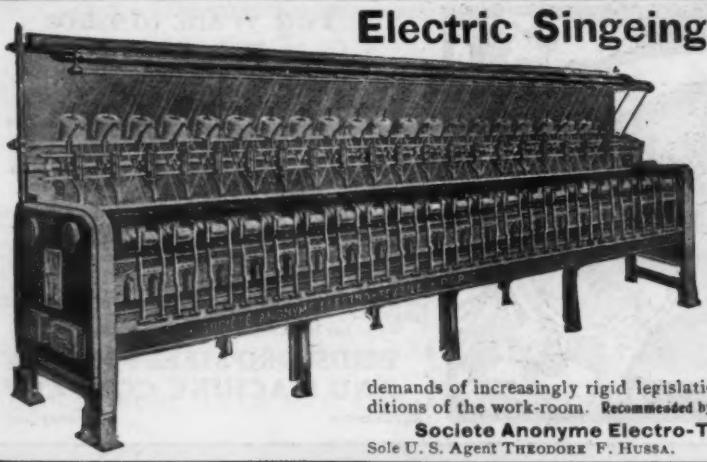
Is the largest manufacturer of HUMIDIFIERS in the world. The last twenty years receiving the HIGHEST AWARD in this country and Europe for its AIR-MOISTENING SYSTEM. EIGHT GOLD MEDALS and others.

The Only Perfect System of Air Moistening

Has Been Adopted by the Representative Manufacturers of this Country.
The only System adopted in the Textile Schools. Write for booklet "T" on Humidification.
Legal proceedings will at once be taken against infringers and users of infringements.

J. F. PORTER, Southern Representative, Room 209, Rhodes Building, Marietta St., ATLANTA, GA.

Electric Singeing Machinery



for Cotton Yarns, Worsted, Silk Schappe, etc.

We lower your cost of production from 30 to 60%.
We produce yarns of finer quality.
We produce yarns of better color.
We give you cleaner, safer work-rooms.
Simple to operate.
The only machine that allows manufacturers to meet the demands of increasingly rigid legislation controlling the health conditions of the work-room. **Recommended by the Commissioners of Labor in France.**

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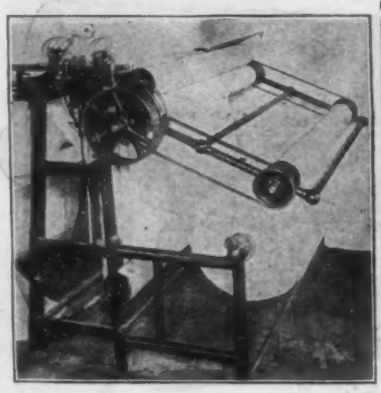
When you decide to Trademark your goods do not spoil a fine fabric by poor lettering



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RIPLEY'S DYE B. D. A.
HYDEGRADE
BURTON'S IRISH POPLIN
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Specimens of work done by the

ROBERT BAIRD SELVAGE PRINTING MACHINE

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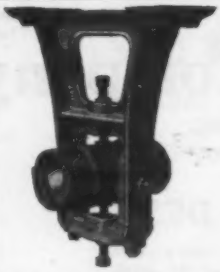
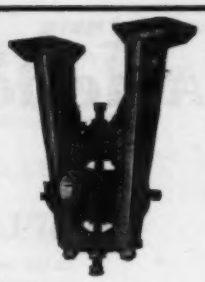


BOND FOUNDRY AND MACHINE CO.

MANHEIM, LANCASTER CO., PA.



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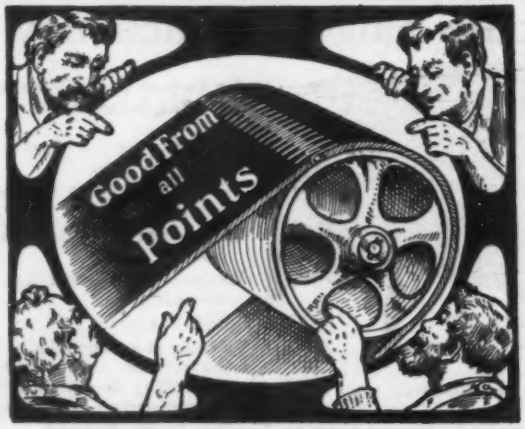
POWER TRANSMISSION



You Want to Lace a Belt with a

uniform, strong, flexible joint, one that will not thump on the pulley—and do it quickly.

A joint with all these points is hard to make by hand, but easy if you use a

Jackson Belt Lacer

This machine makes a joint of intermeshing steel wire lacing that can be connected or disconnected instantly by inserting or removing the raw hide pin. The belt will be stronger at this joint than previously, and you will save on the average 80% of time and money in your belt lacing expenses, just as other textile mills are doing who install this machine.

Write for booklet. **Start saving that 80%.**

BIRDSBORO STEEL FOUNDRY AND MACHINE COMPANY

Birdsboro Pennsylvania

More Efficient Dryers
No More Sluggish Steam Lines
result from the installation of

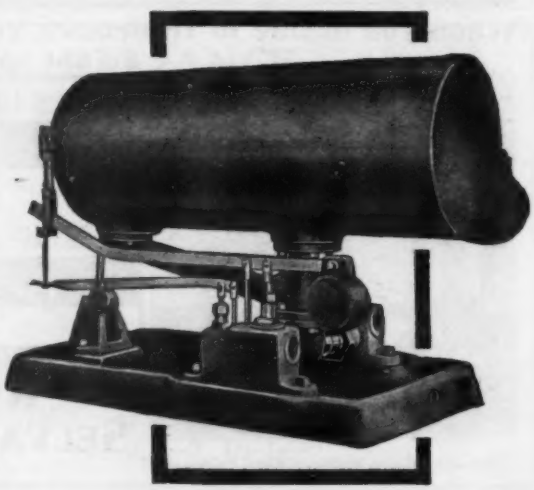
"Detroit"
RETURN TRAPS

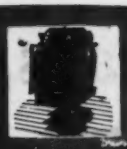
Every operation automatic.
Practically take care of themselves.
Have only 4 working parts.
Once properly installed—give long and continued good service.

Bulletin No. 326-TR upon request.

AMERICAN BLOWER COMPANY
DETROIT, MICH.
U. S. A.

Canadian Sirocco Company, Limited, Windsor, Ontario, Manufacturers for Canada.





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TURBINE WATER WHEELS — VERTICAL AND HORIZONTAL, HEAD GATE GEARING, REGULATORS, AND EVERYTHING PERTAINING TO WATER WHEELS AND MILL WORK.

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SOAPING MACHINES.

UNDERWRITER ROTARY FIRE PUMPS.
NATIONAL STANDARD TYPE A AND B MOTOR OR FRICTION GEAR DRIVE.

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SALEM ELEVATOR WORKS

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ELEVATORS

ESPECIALLY ADAPTED FOR MILL USE.

SEND FOR ILLUSTRATED CATALOGUE AND ESTIMATE.

The Murphy Automatic Smokeless Furnace

Burns Slack with Great Economy

The Murphy can be installed under any type of fire-tube or water-tube boiler and to units of any size.

SETTING UNDER TWO TYPES OF BOILERS SHOWN HEREWITH

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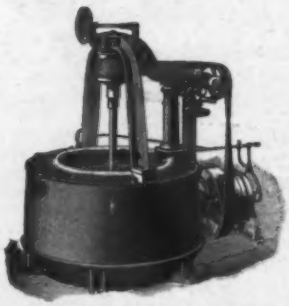

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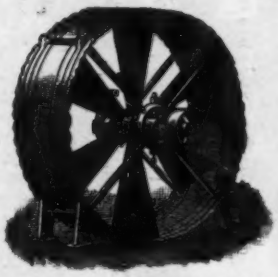

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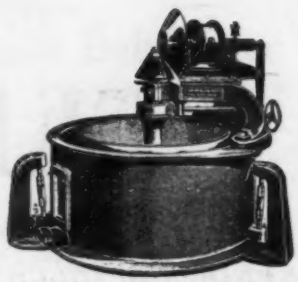
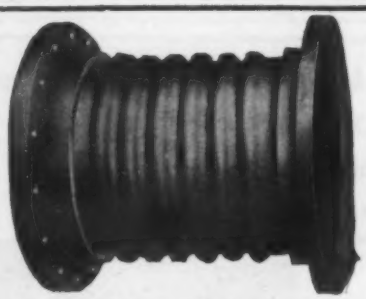


Machine "C" Belt Driven



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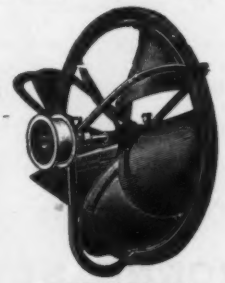

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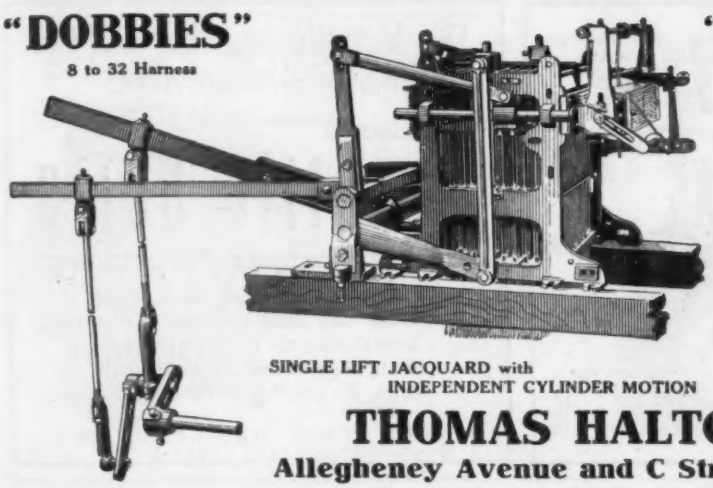

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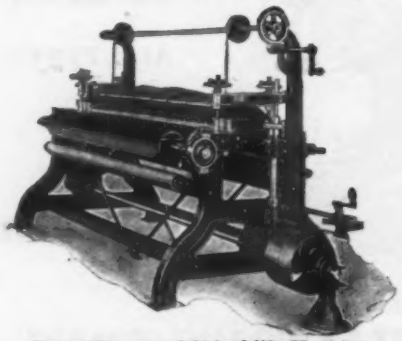

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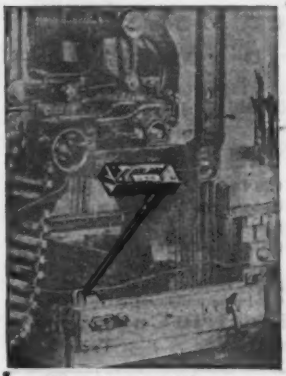

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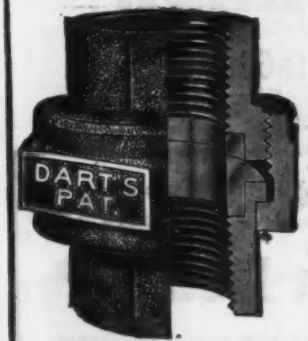

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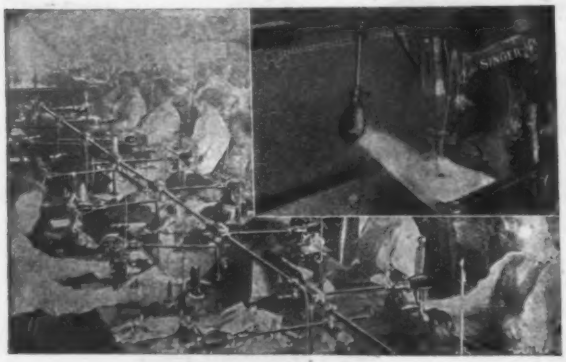

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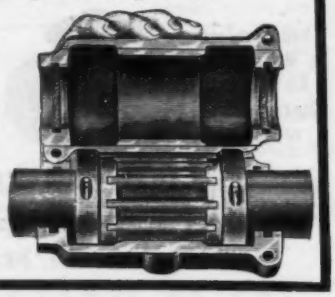

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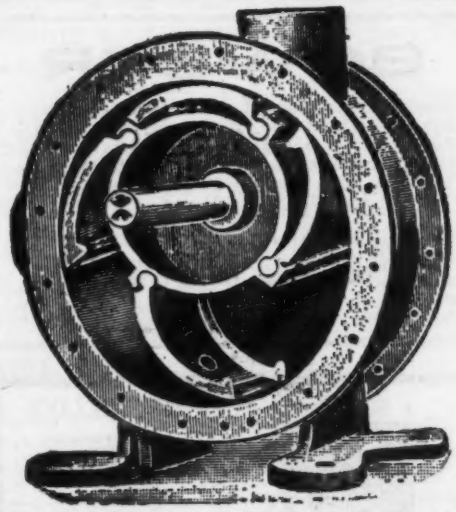

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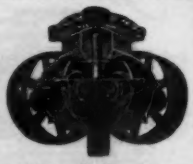

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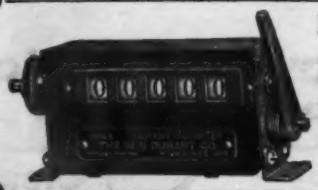

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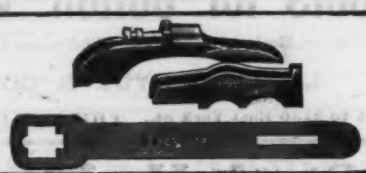

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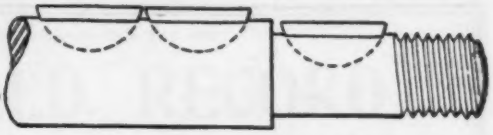

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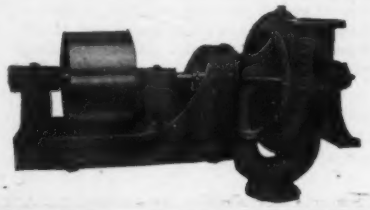

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Correspondence

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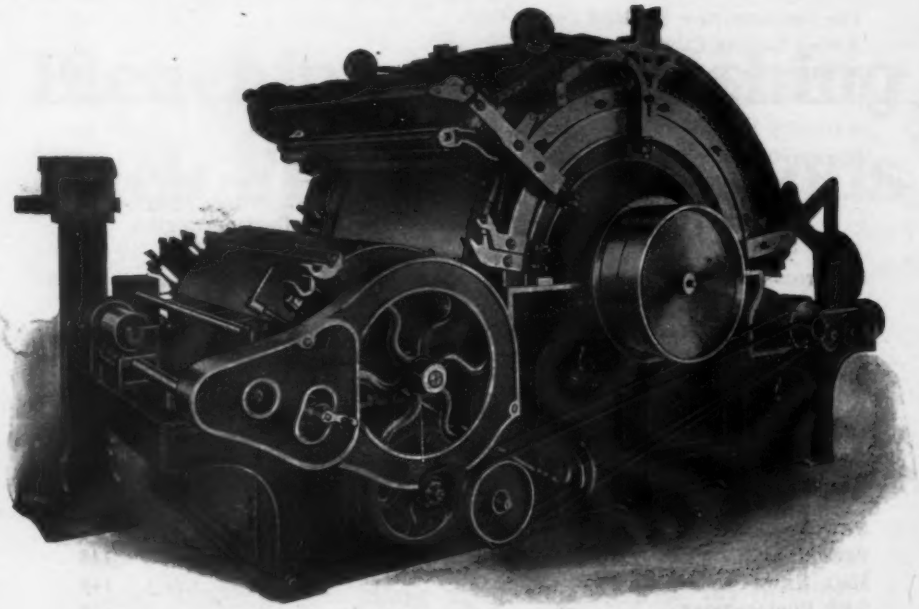
COTTON MACHINERY



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TEXTILE WORLD RECORD

OCTOBER, 1912

Monthly Comment.

Give and Take

The comment in the German press on the visit of a party of seven Japanese cotton manufacturers to Europe and America, furnish a rather amusing contrast to the alacrity with which German cotton manufacturers improved an opportunity a few years ago to study cotton growing and manufacturing in the United States during the excursion of more than a hundred European manufacturers to this country. Speaking of the Japanese party the "Chemnitzer Tageblatt," under the heading "Industrial Spies," says:

> It is announced from Tokio that Herr Mata, a director of the Fiyi Cotton Mill, left Japan on August 7 on a visit to Germany, France and England for the purpose of making a study (!) of the European cotton industry. The same gentleman will represent Japan at the International Cotton Conference at Alexandria, Egypt. On his return he will visit India for the purpose of studying the markets in that country. He will be accompanied by six Japanese cotton manufacturers who have planned to visit America in order to study the cotton markets there. As Japan is one of Germany's sharpest competitors in the cotton industry, the German manufacturers in that industry now have warning.

Excursions of manufacturers, such as the one to the United States in 1907 and the visit of the six Japanese manufacturers to Europe and the United States this year, have for their main object the gaining of information about the business in which the excursionists are engaged. Such journeys usually afford the travelers an enjoyable vacation and an opportunity to add to their list of friends, but the main object is to study their industry as carried on in foreign countries. While the chief purpose of such visits is self-evident, it is equally plain that no one is under any obligation to supply the information which the visiting foreigners may seek.

We state these truisms because of the German reference to the Japanese visitors as "industrial spies," which, coming from such a quarter, is especially inexcusable because of the energy and enthusiasm which German cotton manufacturers have shown in studying cotton growing and manufacturing in other countries. Take for example the visit of more than a hundred European cotton manufacturers to the United States in 1907. In this party were nineteen Germans, who carried off the palm in the study of American methods of cotton growing and manufacturing. We recall one of the German gentlemen in particular, Moritz Schanz, of Chemnitz, who surpassed all others in the party in the investigation of cotton growing in the United States. Even the banquets that lured the rest of us were no temptation to him if there was a cotton plantation or an agricultural college within reach. His bulky and well-filled note books bore testimony to the success of his studies and to the mass of useful information that he carried home with

him. Nor was his work considered in any degree improper. He made no attempt to conceal his thirst for knowledge, and he was welcomed to plantations and agricultural stations with open arms by Americans, who apparently were as ready to encourage cotton growing in Togo as in Texas.

Undoubtedly this readiness to help Herr Schanz was due to the confidence in the natural advantages of the South in the growing of cotton. Where actual or potential competition with foreign producers was to be found, as in the manufacturing of cotton goods, the visitors did not meet with the same warm industrial welcome, although the social amenities were as genuine and as thoroughly enjoyed.

It is difficult to discover any fundamental difference between the European cotton excursion to America in 1907 and the Japanese cotton excursion to Egypt, Europe and America in 1912. The naturally secretive and inscrutable character of the Japanese and the supposed danger of competition because of the low cost of production in Japan may make it more difficult to discard international prejudices, but surely the example which the Germans themselves have set prevent their calling visitors from the Orient "industrial spies." There is no reason for Americans to accord to the Japanese treatment in any way different from that given to the Europeans in 1907. If, as in cotton growing, our industrial position is secure, the foreigners will doubtless find easy access to the "secrets" of the trade. In cotton manufacturing, where Japanese competition is a menace to American manufacturers, the industrial welcome naturally will not be as warm. But even among cotton manufacturers there is no occasion to look upon the Japanese party as spies.

A Textile School on a Commercial Scale

Much has been said both for and against the policy of operating the machinery of textile schools on a commercial scale. Those who object to it claim that the object of the school, which is the training of the student, is made subordinate to the running of the machines for the greatest income, and that many courses are eliminated and all are curtailed by converting the school into a textile mill. On the other hand, the advocates of commercial work in textile schools claim that it overcomes the most serious objection to textile schools namely, the excess of theory and the lack of practical training by which the usefulness of the graduate is greatly impaired. After carefully considering the claims for commercial work in the school and the objections to it, the managers of the Mississippi Textile School, at Agricultural College, Miss., have decided to put the system to a practical test by operating the spinning department commercially. They have begun work on an order for 10,000 pounds of 2/8s knitting yarn, and have installed the necessary equipment to give a daily production of 750 pounds.

The Russian Tariff on Wool

Russia is having her difficulty with the wool tariff. The trouble arises from the fact that one specific rate (3 roubles per pood = 4 3/10 cents per pound) is imposed on both grease and scoured wool. As the grease wool used largely by the Russian mills shrinks from 50 to 60 per cent., the duty amounts to 8 1/2 to 11 cents per scoured pound if the wool is imported unscoured. As a result nearly all the wool imported into Russia is scoured abroad, and the Russian wool scouring industry has been seriously crippled. The Russian Association of Wool Manufacturers has recently presented a petition to the government, calling attention to the discrimination and asking that the duty on grease wool be graduated from 1.26 to 1.50 roubles per pood (1 8/10 to 2 1/8 cents per pound), so as to make the rate equal to 4 3/10 cents per scoured pound regardless of whether the material is imported in the greasy or scoured condition. Their proposition, as outlined in the "Zeitschrift fuer die gesamte Textil-Industrie," apparently involves some method of graduating the specific rate according to the shrinkage of the imported wool, and while the pub-

lished report of the petition makes no reference to an ad valorem duty, it is not likely that the Russians will be able to escape consideration of this interesting corollary, once they are fairly embarked on the sea of wool tariff agitation. The Russian attempt to reach a solution of this question will be watched with interest.

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Depression in the Italian Cotton Industry

The Italian cotton industry has not yet reached the end of its difficulties which began a year or more ago as the result of wild method of financing. The largest spinning mill at Turin, employing over one thousand hands, is the latest establishment to go to the wall. Spinning and weaving mills throughout the country almost without exception are running on very short time. Last month we noted the efforts to reorganize the Italian cotton industry by bringing the leading mills into a combination. Recent reports are to the effect that this combine has not yet been effected.

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Production and Consumption of Wool

An interesting estimate of the world's production and consumption of wool appeared in a recent issue of Dalgety's Review. The wool spindles in all countries were given as follows:

England	spindles	6,684,526
Germany		5,084,069
France		3,078,013
Austria		850,000
United States		4,021,098
Belgium		656,677
Russia		800,000
Italy		250,000
Spain		150,000
Japan		400,000
Increase in former countries and number of spindles in other countries		1,025,625
Total		23,000,008

The Review then makes the following comment on the wool consuming capacity of these spindles and the actual supply:

In estimating 1,025,625 spindles, we take into consideration an increase in spindles throughout the entire world since 1907. Taking these 23,000,000 spindles in the whole world, and assuming that each spindle produces about 1.32 lbs. per week—23,000,000 × 1.32 lbs. = 30,360,000 lbs., and for 52 weeks—30,360,000 lbs. × 52 = 1,578,720,000 lbs.

It must not be forgotten, however, that in these 1,578,720,000 lbs. of yarns produced there are a large number of carded yarns in which cotton, silk, noils and waste enter in a certain proportion. Supposing that 489,600,000 lbs. of these yarns are produced with wastes and other kinds of material. This means that there is an annual production of 1,089,120,000 lbs. of combed yarns.

Taking then the production of wool:

Greasy Wool.	
The Argentine produces about ...lbs.	584,000,000
Australia	1,102,000,000
Africa	160,000,000
Asia	216,000,000
Europe	811,000,000
North America	339,000,000
Total	3,212,000,000

The average yield of thoroughly washed wool can be estimated at 40 per cent. of 3,212,000,000 lbs. or 1,284,800,000 lbs. clean scoured wool. It seems then that consumption is about equal to production after allowing for the weight of the waste in the combing process, viz., noils.

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International Linen Congress

The third annual congress of linen spinners was held recently at Cologne, Germany. Among the subjects discussed were the following: 1. Purchase of Russian flax and tow: It was resolved that the general rules governing purchases of flax in Russia should go into effect three months after the enactment of the bill now under consideration by the Russian government, or not later than Oct. 1, 1913. 2. Courts of arbitration: The Congress recommended that the federated associations take steps to establish courts of arbitration in countries where they have not yet been organized, and to make the rules governing such courts conform to the laws of the respective localities. 3. Contracts for yarn: The members of the affiliated organizations were ordered not to cancel contracts for yarn in case prices dropped below the contract figure. 4. Flax statistics: A resolution was adopted expressing gratification over the publication of an official estimate of the area devoted to the raising of flax in France. 5. Regain for conditioned weight for linen: This question was discussed by the congress and finally referred to the next congress, which is to be held at Gaud, Belgium, in June, 1913. The visitors were entertained at banquets given by the municipality of Cologne and the German trade organizations, and by an excursion on the Rhine to Remagen.

The Testing of Wool for Shrinkage

Dr. D. E. Douty, of the National Bureau of Standards, contributes to the September issue of the Bulletin of the National Association of Wool Manufacturers an article on the wool investigations at that bureau, from which we take the following:

In the trade much dependence is placed upon the ability of the wool expert to estimate the shrinkage. As a means of gaining some information regarding the agreement which would exist between the estimates of different experts upon the same samples, also the accuracy with which the estimates can be made, four samples were selected representing a range of shrinkage from 45 per cent. to 70 per cent. These samples were submitted to ten expert wool men in Philadelphia, Boston, and New York, representing large firms.

A summary of the results follows:

Sample of Wool	Average Estimated Shrinkage of Ten Experts	Actual Shrinkage, Bureau of Standards	Error of Average	Greatest Individual Error
Territory	70.6%	71.2%	–0.6%	7.4%
New South Wales	56.9	61.0	–4.1	5.9
Australian 80s	55.1	48.5	†6.6	5.1
Australian 70s	50.8	45.6	†5.2	6.1

† indicates estimate too high
– indicates estimate too low

Individual estimates were oftentimes very nearly correct. Before forming an opinion it would, however, be well to extend this test to a wider range of wools and a larger number of estimators.

According to this exhibit the average of the wool experts' estimates for each lot varied from 6.6 per cent. in excess of the Bureau's report to 4.1 per cent. less than that report. Taken at its face value this is rather hard on the experts, but a closer study shows the unfairness of the comparison, which starts with the assumption that the Bureau's test is based on the weight of scoured wool in a standard condition. That assumption is particularly unwarranted in view of the inexperience of the Bureau of Standards in this line of work. It is well known that different scouring tests of wool usually show a considerable variation in the amount of grease remaining in the scoured fiber, and that the exact amount of this residue can be determined only by chemical analysis. Dr. Douty omits to state the amount of this residue or whether such analysis was made. With that information lacking there is no known basis for using the Bureau's figures for any such comparison as the above.

Despite this lack of a definite basis for comparison Dr. Douty compiles his comparative table on the assumption that the Bureau's test is based on the weight of scoured wool in standard condition, and calmly tabulates all variations from it as "error." This is anything but scientific, and the ten wool experts from Boston, Philadelphia, and New York, who are thus officially scheduled as a lot of wild guessers, have a right to complain of the manner in which their estimates have been treated. We do not for a moment believe that the officials of the Bureau of Standards intend to be unfair. Their error is due to inexperience and a certain bureaucratic cocksureness, which the Bureau of Education recently illustrated by arbitrarily dividing the colleges of the country into first, second, third, fourth and fifth class.

We suggest that before the Bureau of Standards goes any further in testing wool for shrinkage it subject its own methods of scouring to a fair test. This can be easily done by layering and mixing say five hundred pounds of wool so as to make the lot uniform as regards shrinkage. Then divide this batch into fifty equal parts of ten pounds each, and start the wool scouring force of the Bureau testing each lot at the rate of not more than one lot per day. The results of these tests should be tabulated in detail to show the weight of the wool as scoured and the "clean content" as disclosed by a chemical analysis. It would be particularly fitting if one or more of the ten wool experts should overlook these tests, but that is not necessary. We all have confidence in the Bureau of Standards, and the tests if supervised by Dr. Stratton or any other official of the bureau would be accepted without question.

Instructive as such a series of tests would undoubtedly be to the officials of the bureau, they would not touch upon the sampling of large lots, which is the source of greatest error in testing wool for shrinkage. Dr. Douty evidently realizes its importance for in the same article he says:

From the results thus far obtained it appears that the scouring process can, by careful manipulation, be so controlled as to give concordant and

thoroughly reliable results. It is believed that a standard laboratory method of sample scouring can be developed. Of course it is realized that to be of extensive use such a method requires a satisfactory method of sampling. Through the generous cooperation of some members of the National Association of Wool Manufacturers the Bureau has begun comparisons of different methods of sampling and the results thus far are very encouraging. The plan involves the selection of five and ten-pound samples from the lots as they are received at the mills, the number of samples from each lot depending upon the number of bales in the lot. A record will be kept of the lots as they pass through the mills and the selected samples will be scoured in the laboratory. In both cases the remnant grease will be determined.

It appears from this that the Bureau of Standards is still working on the problem of sampling from large lots and has not yet decided on a standard method. And yet this is the bureau that for years has given its official approval to the practicability of the plan to base the wool tariff on the "clean content" of grease wool. Every practical wool manufacturer knows that scheme is wholly impracticable. The issue of the Bulletin of the National Association of Wool Manufacturers in which Dr. Douty's article appears contains this reference to the Hill bill and the "clean content" proposition:

> This measure, with its ill-arranged rates and particularly its insistence on the impracticable "wool content" basis of compensatory duties, would have had as sinister a result upon the industry as the Underwood-La Follette bill itself.

The Bureau of Standards is one of the chief offenders in regard to this impracticable "clean content" scheme. It was that bureau which officially indorsed it over three years ago, and if it had not been for that indorsement the scheme would not have been proposed in Congress then, nor would it have gained the approval that it has obtained since. Everyone recognizes the high scientific attainments of the officials of the Bureau of Standards, but the record that they have made in their wool investigations shows clearly how dangerous it is for purely scientific men to undertake the solution of industrial problems involving conditions of which they have made no adequate study.

The United States purchased over $44,500,000 worth of raw silk through Yokohama in 1911.

Textile Weights and Measures

In another part of this issue will be found an estimate of cost of a cotton blanket manufactured in large quantities in Europe for the Indian trade. The estimate was made by G. Gauss and is taken from a recent issue of the "Leipziger Monatschrift fuer Textil-Industrie." It will interest blanket manufacturers in the United States as an example of the manufacturing results obtained by German mills, although American mills have at present no part in this particular trade. A feature of the German estimate deserving of consideration is the confusion of weights and measures, which does not appear in our translation because we have reduced all weights and measures to their English equivalents. A brief account of the German mix-up will be useful as a warning against the unfortunate regulation of weights and measures by the bureaucratic German government.

The estimate starts with a statement of the filling stock, which is made up of seven kinds of cotton waste, the weights being given in kilograms (2.20 pounds) and the price in metric centals (220 pounds). The weight of the yarn obtained from this batch is then given in half-kilograms (1.1 pounds), while the size of the yarn (1 1/4s) is given by the English count based on 840 yards per English pound.

The size of the cotton yarn (28s) used for warp is also given in the English cotton count. The cost of the warp yarn is given by the English pound, while the size is guaranteed to be 740 meters per count of 840 English yards, the full length being 768 meters.

The length of the warp on the loom beam is given in meters (1.091 yards). The woven and finished widths are given in centimeters (.3937 inch). The filling set, however, is given in picks per 5 centimeters because the metric system supplies no unit, like the English inch, that is suited for the set of textile fabrics. The centimeter (4/10 inch) is too short; the decimeter (4 inches) is too long; two and one-half centimeters, which is the equivalent of the English inch, is the right length for this purpose but this is an awkward expression because of the

mixed number. So the German is driven to the use of 5 centimeters, equal to 2 English inches.

The estimate of the cost is for a length of 100 meters (109.1 yards). The cost of the warp yarn is given per English pound. The weight of this yarn in English pounds is calculated by dividing the ends in the warp by the product of the English count (28s) and the guaranteed length of 740 meters per yarn count.

The cost of the filling yarn is given per half-kilogram (1.1 pounds). The weight of this yarn in half-kilograms is calculated by first multiplying the picks per 5 centimeters, the warp length in meters and the loom width in centimeters together, and then dividing the product by the product of the English yarn count, the length in meters of an English pound of No. 1 yarn (English count), 5 centimeters and 1.1 (the number of English pounds in a half-kilogram).

The confusion in this German estimate of cost is a fair sample of the condition into which German textile weights and measures have been brought by forty-two years of effort to introduce the metric system into that country.

The Mill Cost of Army Goods

Germany is famous for official surveillance of persons and things. This is in part necessary because of the political conditions by which the nation is surrounded, but aside from that, the Germans appear to have a natural as well as a cultivated talent for official detail. This characteristic has been exhibited in all its rigor in the purchase and testing of uniform cloth for officers and men of the German army. The system apparently left nothing to be desired so far as maintaining the quality of the cloth was concerned, but it did not satisfy the officials charged with the purchase of wool uniform cloth for the twelfth (Saxon) army corps. Some time ago they conceived the idea of requiring each bidder for army contracts to state in detail the mill cost of the cloth to be supplied. Accordingly in the call for bids, dated June 8, the Saxon official corresponding to our quartermaster general stated that each bid for supplying wool uniform cloth must be accompanied by a statement of the cost of the goods, made out in accordance with a cost blank supplied by the department. The authors of that innovation probably know better now, for it aroused a storm of protest among the wool manufacturers of Saxony, who immediately enlisted the cooperation of the chambers of commerce in their opposition to the objectionable requirement. As a result the chambers of commerce throughout the kingdom have united in presenting the following protest to the Saxon Minister of War:

"The demand of the Royal Quartermaster General for a detailed calculation of mill costs goes so deeply into the business and manufacturing secrets of the individual firms that it will be found wholly unreasonable. The mills manufacturing wool goods, as the military authorities must know, are equipped in different ways. They use machines and apparatus of different construction; some old, some new. This variation in the equipment does not necessarily have any effect on the quality of the goods, but will effect the calculation that is demanded, because one machine may do the work at a lower cost than another. Such a calculation bears on the innermost details of the business. One manufacturer may possess advantages in dyeing his goods owing to years of experience, and can, therefore, estimate the dyeing cost at a lower figure than can his competitors, while still another manufacturer by reason of better conditions in the finishing department, can place a low estimate on the cost of finishing the fabric. If all of these manufacturing secrets, which ordinarily are guarded with the greatest care, are to be revealed to third persons or to the authorities, it will work a great hardship on the manufacturers, all the greater because in filling out the question blank there is no guarantee that wrong conclusions may not be drawn from it. This will be made clear by an example: If a mill by reason of a large purchase of Australian wool at a low price, is in a position to enter a small amount in the column headed 'raw material,' then a person not acquainted with the particular condition might conclude that the firm intended to use a cheaper and, therefore, inferior raw material. As a matter of fact, however, if the manufacturer had taken advantage of market conditions the raw material might easily be better suited for the manufacture of army goods than wool which was purchased when prices were higher. The same is true regarding the purchase of dyestuffs and chemicals for dyeing and finishing. In all such cases the filling out of the question blank offers no guarantee as to the merit or inferiority of the goods, but on the contrary opens up a prospect of wrong conclusions and errors on the part of the buyer. This danger is all the

greater because the prices to be given in the question blank cannot represent the actual cost, but must necessarily be estimates of such cost. For example: The fluctuations in the prices at the leading wool auctions make it impossible for the manufacturer to do more than give a rough estimate of the probable cost of the wool to be used during the remainder of this year or at the beginning of next year in the goods that he will deliver to the government if his bids are accepted."

In commenting on this petition the "Wochenberichte der Leipziger Monatschrift fuer Textil-Industrie" says:

"The chambers of commerce are compelled to accept this view of the case owing to their own experience in such matters and, therefore, the Saxon Minister of War should give orders that bids for contracts to supply the army with uniform cloth need not be accompanied by a calculation of the mill cost. They point out the variation in wages in different mill districts as showing that the mill cost cannot be accepted as a standard by which to judge of the value of the goods delivered to the government. As the filling out of the government blanks offer no advantage or guarantee to the manufacturer or to the authorities, it follows that the army officials should abandon the plan to force the manufacturers to reveal the secrets of their business, with which they are compelled to reckon at all times."

This Saxon protest is of special interest because it bears directly on the investigation of cost differences, in which the United States government has been engaged for several years. We are all familiar with the extensive scale on which this investigation has been conducted, the great amount of time and money expended, and the high official backing which it has commanded. After this prolonged and elaborate effort to determine foreign and domestic cost, the recent Republican convention at Chicago virtually acknowledged the undertaking to be impracticable by omitting to reaffirm the formula in the platform it adopted. In view of this acknowledgment and the convincing protest of the Saxon chambers of commerce it affords us satisfaction to recall our warning against the difference in cost formula in July, 1908. On July 23, 1908, Major John M. Cason, chief of the Bureau of Manufactures, wrote us that he had been requested to obtain foreign data for the Ways and Means and Finance Committees, and asked us to suggest questions to be submitted to foreign manufacturers in making the inquiry. Our reply, dated July 25, 1908, was published in the March, 1909, issue of this magazine. After making the suggestion as requested, we told Major Carson that in our opinion "it was impossible to get the required data," and to emphasize this point we gave the following mathematical illustration:

It (the difference in cost proposition) is an attempt to determine the value of an unknown quantity from three unknown and unknowable quantities. For example:

Let v = Cost in America.
w = Cost abroad.
x = Reasonable profit.
y = American duty.

Then the problem is to find the value of y from the following equation:

$$v - w + x = y.$$

The principles underlying this question were as plain in 1908 as they are now, but nowhere have we found a clearer or more convincing statement of them than in the protest of the Saxon chambers of commerce against the order that bids for army contracts must be accompanied by statements of the cost of the goods.

Cotton Operatives in India

The working time for operatives in Indian cotton mills was reduced to 12 hours per day on July 1. Previous to that date the mills had run from sunrise to sunset, making a working date that varied from 11 1/4 to 13 hours. In mills lighted by electricity the working time was frequently made of 13 hours per day. The reduction to twelve hours is taken by a correspondent in the "Manchester Guardian" as an occasion for some observations on conditions in Indian mills. He states that the change has been received with complete apathy by the Indian operatives, and gives this explanation:

The average Indian operative is very happy-go-lucky; he has no education, very few wants, exceedingly low cost of living, and no care for the future. So long as he is assured of enough money to have a good time—though not in ways that are at all good for him—at the end of the month, he has few cares. His movements in work or amusement are not to a minute or two or an hour or two. He takes his meals at all times or any time, and unless the management is very alert he sleeps on every possible opportunity. There may be some element of give-and-take in the easy-going ways of the native, but it is mostly take. As a result much more waste is made in an Indian mill than in an English mill, and the cost of repairs and renewals is also very much higher.

The reduction of working time has not been received with the same equanimity by the Indian employers, who on the contrary are very much disturbed by it:

The employers, however, have more definite views on the uniform working day. Some of them express strong opinions against what they call "Lancashire interference," because they consider it is due to the agitation of the Lancashire trade unions that the new regulations have been made. They have also the idea that the movement is only for the purpose of making it more difficult for Indian mills to compete with Lancashire mills. It is clear to any close observer of Indian mill working that if such an idea exists in Lancashire it is a mistaken one. During the last fifty years the hours of labor have been reduced, and wages increased in Lancashire mills, and yet the labor cost per pound of yarn produced is only about one-half of what it was to begin with. One ventures to believe that the same results will ensue in India, particularly if a regular time can be fixed for meals, and thus allow the machinery to be run more regularly.

The "Guardian's" correspondent states that an Indian cotton yarn mill of average size contains about 30,000 spindles, and that the counts vary from 6s to 24s, with the following force to operate it:

In the blowroom:—One head jobber, one clerk, one oiler, one feeder to each opener, one man to each scutcher, and probably four spare hands.

In the cardroom:—Probably about 94 cards, requiring one head carder, one head jobber, three assistant jobbers, one oiler, four lap carriers, 12 strippers, 10 card tenters, two fly carriers, three sweepers, one head grinder, three assistant grinders, four spare hands, and one fitter.

Drawing frames:—These will consist of 33 heads of seven deliveries each, and will require one head drawer, one oiler, 33 drawers, 11 spare drawers, and one sweeper.

Preparation frames:—Say, 11 slubbing frames, 22 intermediate frames, and 40 roving frames, requiring one head jobber, four assistant jobbers, 11 slubbers, 22 intermediate, 40 rovers, 30 spares, four creel boys, eight sweepers, four head doffers, 48 doffers, three bobbin carriers, one roller coverer, 40 spares, two fitters, and one clerk.

Ring frames:—About 300 spindles long, that is, 150 spindles on each side, and the number of operatives required will be one head spinning master, one head jobber, two line jobbers, 10 doffer jobbers, one head doffer jobber, eight oilers and banders, 200 siders, 60 followers, 120 doffers, four weighing coolies, four doff carriers, four bobbin carriers, two roller coverers, 100 half-timers, two clerks, and one fitter.

Besides the foregoing, which amount to about 800, there will be at the least another 50 odd hands to pick the large amount of waste which is made, and for other purposes; or, say, a total of at least 850 workpeople.

This force of 850 operatives is, according to the "Guardian's" correspondent, about four times the number required for an English mill of the same size. The large number of "spare" hands in the Indian mill is thus accounted for:

So many operatives cannot be relied upon for anything at the end of the month when they receive their wages, and the irregularity in attendance is always so great that these spare hands have to be kept, at great addition to the cost of production. Lancashire people might ask why irregular or unsatisfactory workers are not discharged. This is easy to recommend, but unwise to do, as there is occasionally, particularly during

EXPORTS AND IMPORTS OF RAW WOOL, YARN AND WASTE.

Lbs. in units of one million. Value in units of $100,000.

Year Ending June 30.	Exports.		Imports.					
	Wool.		Wool.		Shoddy, Noils, etc.		Yarn.	
	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.
1890	.231	.335	106.3	152.6	5.0	20.5	3.5	19.9
1891	.291	.394	129.3	182.4	1.2	4.3	2.0	11.9
1892	.202	.306	148.7	196.9	.3	.9	1.3	7.5
1893	.091	.148	172.4	210.6	.3	1.1	1.2	6.9
1894	.520	.906	55.2	61.1	.1	.5	.5	3.6
1895	4.289	4.844	192.8	229.9	14.1	19.8	2.4	11.7
1896	6.945	8.569	228.4	315.0	18.7	26.5	2.0	10.5
1897	5.271	6.199	366.6	587.5	49.9	69.3	1.8	9.6
1898	.121	.180	132.8	167.8	3.3	6.9	.3	1.9
1899	1.683	2.378	76.7	83.2	.3	.7	.2	1.1
1900	2.200	3.872	155.9	202.6	.4	.9	.2	1.3
1901	.200	.240	104.0	125.2	.6	1.8	.2	1.5
1902	.123	.133	166.2	177.1	.2	.6	.4	1.9
1903	.518	.718	177.1	221.5	.3	.9	.3	1.9
1904	.319	.371	173.7	248.1	.2	.5	.1	1.1
1905	.123	.150	249.1	462.2	.2	.8	.1	1.2
1906	.192	.290	201.7	390.7	1.2	4.3	.2	1.6
1907	.214	.488	208.8	415.3	.6	2.7	.1	1.5
1908	.182	.421	125.9	236.6	1.2	1.2	.2	1.5
1909	.628	.047	266.4	451.7	.5	1.4	.3	2.3
1910	.047	.010	263.9	512.2	—	—	—	—
1911	—	—	137.6	23 22	—	—	—	—
1912	—	—	193.4	330.8	—	—	—	—

the months of April and May, a great shortage of hands owing to the large number who go up country to spend some time with their families or to help in preparing the land for sowing before the monsoon. It is surprising to learn the number of poor people who possess land. This makes the workpeople very careless about being discharged. They know the millowner is compelled to pay their month's wage if he discharges them. This indeed suits their purpose, as they can then go to their homes without serving the usual month's notice, and without losing their wages. They also know that when they choose to return they will have no difficulty in securing work.

A Message to Cotton Spinners

The cotton spinners of Lancashire have recently had addressed to them a remarkable message in three installments through the advertising columns of the "Manchester Guardian." Each installment filled two full columns of the "Guardian" with bold faced type, and related to a plan for a cotton selling agency, which was to benefit both producer and consumer. One of the advertisements gave this explanation for their being anonymous:

> The authors of this announcement and the former one do not propose to disclose their names. It would serve no useful purpose and might possibly interfere with negotiations that are pending.

The first announcement, on September 6, began with this diplomatic introduction:

> The Lancashire spinner has many great qualities. The skill and efficiency of the industry, the wisdom and liberality of the spinner's dealings with labor excite the admiration of the whole industrial world. In excellence of equipment the English spinning mills compare very favorably with those of any other country, whether in America, or Europe, or Asia. Their power plant is up-to-date and economical, their spinning machinery is never allowed to grow obsolete, their output is big and of a quality unequalled throughout the world.

There is, however, a link missing in the Lancashire chain of perfection, and this fact is thus disclosed:

> Yet in spite of all this there is one matter about which the spinner is strangely indifferent. Unlike other people who control great industries, he has never thought it worth his while to take any active part in the growth and cultivation of his raw material. He is content to take his raw material from the merchants and to look no further than them.

The Lancashire spinners are then reminded that steel works, paper mills, chemical plants and rubber manufacturers do not depend on merchants for their raw material, and the obvious conclusion is seductively disclosed to the Lancashire mind in an interrogative form:

> Why do not cotton spinners do the same thing? Are they less enterprising than their neighbors in other trades? Is there any serious difficulty in the way of getting control of cotton-growing lands? Clearly there is not, for a great and successful spinning corporation has already taken a step in that direction, the wisdom of which nobody who knows anything of the matter can question.

After an elaboration of this line of argument the Lancashire spinners are treated to this glimpse of the glorious Delta of the Mississippi:

> If all these people can make it pay, why not the spinner? The Delta of the Mississippi, where a Lancashire spinner would look for suitable estates, is a fair and fertile region, with ample facilities for transport both by rail and river. Other people, in their anxiety about raw material, have to buy land in wild and remote regions where a white man is hardly ever seen. It would make their mouths water to hear of the chances that a spinner has to take an interest among a settled, civilized white population. Not only that, but in the Delta of the Mississippi the value of land is rising so rapidly that if the estate grew nothing but weeds its value in ten years would be great enough to pay a handsome return on the investment.

The spinners, having had this account of the riches of this promised land, are then told they must wait for four days for the next disclosure:

> Further facts about the Mississippi Delta, and an outline of the lines on which spinners ought to proceed, will be given in a further announcement on Tuesday.

Tuesday, September 10, came at last and with it the "Guardian" bearing the second installment of glad tidings. For the benefit of those Lancashire spinners who may have missed the first chapter, the second begins with a brief synopsis of what has already

been told, and then continues with a variation from the former style of appeal by playing upon the spinners' fears:

Last year's crop was exceptionally big, but the spindles of the world have increased so greatly, due to the world's requirements, that every bale of it was taken and a fair price maintained throughout the season. This year's crop promises to be nearly as large, but has been subjected to violent fluctuations, and if it is followed by an eleven or twelve million bale crop the following year some spindles will go short of cotton and high prices will prevail.

And now with the spinners' mouths watering for the Delta of the Mississippi, because of what the first chapter hinted at, and with their fears aroused because the second chapter has raised the specter of a cotton famine, the writer of the story loses no more time, but comes at once to the nut of the thing:

The spinner, then, who has an interest in a plantation will be free from anxiety. Whatever the speculators do with the market he will always have a source of supply. If he has to pay market price for it he will only be paying the extra money into his own pocket instead of into the pocket of the speculator. If the price is so high that his margin for spinning is gone, then he has a second chance to make it up from his interest in the plantation. He will, in fact, compound his profits. Further than that, by his connections in the cotton-growing districts he can get first-hand information which will enable him to check the prices he is asked for his cotton and shed very useful light on the crop reports and prospects.

Next comes a reminder of what has been said:

And from what has been said above, if the property lies in the Mississippi delta it can hardly fail.

Then follows this blending of history and prophecy:

Ten years ago spinners could have bought land in the best cotton-growing districts for half of what they would have to pay today. In ten years spinners will be looking for land at twice the price they are asked to pay today.

The anonymous writer does not want to make his Lancashire readers nervous, and so proceeds to allay their fears by this revelation:

Without in any way trying to make the spinner nervous about his supply, it should be borne in mind that long staple cotton such as most Lancashire mills use can only be grown in a small part of the cotton-growing district, and the consumption of that kind of cotton is going up at a tremendous rate.

While the Delta lands are but a "small part of the cotton-growing district," the hopes of the Lancashire spinners that they may possess some of the land are buoyed up by this reassuring explanation of the providential balance that persists between a small supply and great demand:

There is still plenty and to spare, but the best portions—that is, the parts near both rail and river—are rapidly being taken up.

Now comes the most touching part of the appeal. Of course no one, least of all the American cotton planter, is after the Lancashire spinners' money, but what the planters do want is the spinners' company as partners in the plantations:

The planter is not likely to want for capital, but he is anxious if he can to have his own customers, the spinners, interested as partners in his estates for their mutual benefit.

While "there is still plenty and to spare," there is no time to lose, for already one cotton State has set a time limit to the corporate ownership of land:

So great has been the demand for these lands that the State of Mississippi has passed a law forbidding any corporation, either home or foreign, from acquiring additional lands in the State after November 1st of this year.

The second announcement closes by asking the spinners to think the matter over:

In any proposal that is submitted to them the points spinners have to make sure about are, first, the financial arrangements and, second, the scheme of management. The first point can be settled by the spinner's ordinary financial advisers. Of the management arrangements he is himself the best judge. Being a man of affairs and a manager himself, he knows what are the essentials of good management. The best arrangement is probably one on a cooperative basis, in which the planter retains his interest so as to secure indentity of interest between himself and the spinner. But other arrangements have given excellent results. . . . It (the announcement) is not a prospectus nor an appeal in any way for financial support. It is simply the shortest and handiest way of laying a few facts and arguments before Lancashire spinners on a subject on which there is an immense amount of misconception, due no doubt to the sources from which the spinner is accustomed to get his information about cotton and cotton-growing.

Those among the Lancashire spinners who had been convinced by the announcements of September 6 and 10, would naturally have their thirst for further informa-

tion increased by the omission to give any definite assurance as to when it would be given. They were left in doubt, not too long, only three days, and on September 13, the "Guardian" bore a two-column display advertisement entitled "A Message to Lancashire Spinners from Southern Planters. A Plan of Cooperation. Cotton Warehouses in Manchester." This installment gets right down to business at the start:

The president and one of the directors of the Southern Cotton Corporation are at present in Manchester to lay before the Lancashire spinners a plan which they have worked out to give cheaper and better cotton for the spinner and better prices for the farmer.

On July 12 of this year a Convention was called at the State Capital, Georgia, U. S. A., for the purpose of considering the plan of the Southern States Corporation for the better handling of the cotton crop. There were present representatives of the Governors of the various Southern States and other prominent business and professional men. The Conference endorsed the Corporation's plan, and it was arranged that representatives should go on a mission to the spinners.

This is followed by a reference to the Atlanta Cotton Conference of 1907, which was all right in its way, but not real business:

When the spinners came to Atlanta everybody hoped something would be done. Spinners declared that they were tired of the endless trouble they had in getting their cotton. . . . The planters, on the other hand, pointed out that they were a much weaker body than the spinners, that the spinner was always a man of some wealth and position, whereas the planter was usually a small farmer, dependent on a factor for his seed and stores, and selling his cotton to pay for them. He therefore had no time to think of organizing. It took him all the time, working hard, to pay his debts at the end of the season. . . . The spinners went back to Europe and the planters to their farms with no definite result.

But the Atlanta Conference did have at least one result. It awakened interest in cooperative schemes, such as the one the advertiser is slowly and skillfully uncovering to the gaze of those Lancashire eyes that will see:

After the Conference the talk of the planters who had actually met the spinners was reported far and wide in the cotton belt. The consequence was that a far keener interest began to be taken in cooperative schemes. The attitude of the spinners, a sort of benevolent neutrality, was understood. They felt they would have the support and help of the spinner at the right time, but first they must do their share of the work and come to the spinner with a reasonable plan which had the backing of the planters. One or two planters of high standing interested themselves in the matter and traveled far and wide through the cotton belt getting the support of the planters in the most important centers.

The upshot is that the Southern Cotton Corporation have sent their representatives over here to make arrangements about opening an office and to lay their plans before spinners and invite their cooperation in a plan which is bound to go through and which will be of mutual benefit to both planter and spinner.

Now for the remedy. The planter has done his best, and the spinner has done his best, but still the difficulties of doing business continue from year to year because of the middleman, who is the Mephisto of the cotton plot:

But it will be found, if the spinner and the planter can get together, that while on the one hand the planter is constantly trying to improve his land and his crop and the spinner striving always after greater efficiency, the system of marketing remains the same year after year. Everything else has been improved out of recognition almost, but the same bad baling system, the same vicious system of tares, and all the antiquated regulations that the middlemen have saddled on the planter and the spinner flourish as they did fifteen or twenty years ago. Nothing can be done because the middleman opposes every movement for reform. Not that either planter or spinner can complain. The middleman does not pretend that he wants any change. As long as he can play off the planter against the spinner he will get the best there is in the cotton business. It is for the planter and the spinner to put their heads together and devise a practicable plan of cooperation.

As the third and last installment draws to a close the fog enveloping the plan lifts slightly and discloses a dimly defined outline:

The representatives of the Southern Cotton Corporation are fully accredited, and wish to lay before spinners their plan of a selling agency for the farmers which will have warehouses in the cotton States and warehouses and offices in Manchester and will deal directly with the spinners. It is impossible within the limits of this announcement to outline the scheme satisfactorily, but it is suggested that the spinners should get in touch with the Corporation's representatives and hear their plan. The spinners are not asked to take up any part of the stock. They are not asked for financial support of any kind, but simply their counsel and cooperation with a view to the supply of cotton at the lowest possible prices. The Southern Cotton Corporation hope to show how the expenses of the present system may be substantially reduced and in the end eliminated.

Their representatives will be in Manchester again on Monday, and may be communicated with at Box T 99, "M/c Guardian" office.

The Southern Cotton Corporation, whose president is George D. Wadley, Macon, Ga., has a plan by which cotton is to be bought from the planters at a fixed price, 15 cents being usually named, a part to be paid in cash and the balance in notes or bonds, which are to be taken up pro rata as the cotton in storage is sold. Gov. Brown, of Georgia, was so taken with the scheme that he issued a call for a meeting of seventeen governors of cotton growing States to meet at Atlanta on July 12 to discuss the plan. There was no governor present at the meeting, but the governors of North Carolina, South Carolina, Alabama, Georgia, Mississippi, Texas and Kentucky sent their representatives. Resolutions were adopted endorsing the plan of warehousing and cooperative selling of cotton, and it is this meeting to which reference was made in the anonymous advertisements from which we have just quoted. In the absence of definite and detailed information it is impossible to reach a conclusion regarding the proposition so vaguely, but skillfully, disclosed and concealed in the "Guardian." Those who undertook to communicate with the representatives of the Southern Cotton Corporation by addressing "Box T 99, M/c Guardian Office," may and may not have acquired such information. There are, however, a great many people, both in this country and abroad, who are interested in any and every plan to finance the American cotton crop and who cannot make a study of this particular scheme in the roundabout manner suggested. The importance of the proposition that someone, claiming the indorsement of the governors of seven cotton growing States, is presenting to the spinners of Lancashire by anonymous advertisements, will be better understood by recalling these words of the lamented Henry W. Grady:

> What a royal plant it is! The world awaits in attendance on its growth. The shower that falls whispering on its leaves is heard around the earth. The sun that shines on it is tempered by the prayers of all people. The frost that chills it, and the dew that descends from the stars is noted, and the trespass of a little green worm on its leaf is more to England than the advance of the Russian army on her Asian outposts. It is gold from the instant it puts forth its tiny shoot. Its fiber is current in every bank, and when loosing its fleeces to the sun it floats a sunny banner that glorifies the field of the humble farmer; that man is marshaled under a flag that will compel the allegiance of the world, and wring a subsidy from every nation on earth. It is the heritage that God gave to this people forever as their own, when He arched our skies, established our mountains, girt us about with the ocean, loosed the breezes, tempered the sunshine, and measured the rain. Ours and our children's forever. As princely a talent as ever came from His hand to mortal stewardship.

The danger involved in any grand scheme of cooperative warehousing and selling of cotton is that it will be the sure foundation for a gigantic cotton trust, oppressive to both producer and consumer, and which, if once well started, would certainly not stop at the mill gates. There is no dispute as to the existing evils or that their remedy would be facilitated by the right system of baling, warehousing and marketing cotton. But there are worse things than the present system of baling and marketing, and among them is a system which would bale the cotton properly, provide for economical marketing and handling, and at the same time place the entire cotton business in the control of a trust, beside which the greatest trust now in existence would be a pygmy. That is the danger which should be eliminated from any plan for marketing the American cotton crop. And that is why we call attention to this mysterious Manchester proposition, to which the governors of seven cotton growing States are said to have given their approval. We ask that all information regarding this scheme be made public. And we are confident that the governors of North Carolina, South Carolina, Alabama, Georgia, Mississippi, Texas and Kentucky will indorse our call for publicity.

A circular letter has been received by the Premier of Tasmania from the Bradford (England) Chamber of Commerce, warning woolgrowers on the subject of black and gray hairs in wool. The chamber asks the premier to convey to Tasmanian sheep farmers the following recommendations: "(1) That farmers should not breed from black or gray sheep; (2) that the greatest care should be taken in selecting rams from flocks as free from black hairs as possible; (3) that black and gray lambs be slaughtered."

Styles and Colorings for Heavy Weight Overcoatings and Men's Suitings

OPINIONS OF MANUFACTURING CLOTHIERS

The opening of light weight lines of overcoatings and men's wear suitings marks the beginning of preparations by the mills for the heavy weight season. At such a time the manufacturer, designer and selling agent are more or less in the dark as to what fabrics, styles and colorings are to be popular. It is not an uncommon experience for a manufacturer to find that in spite of the greatest precautions, his goods do not sell well because fabrics and styles do not meet the popular demand. Realizing these conditions we have endeavored to obtain from representative clothiers throughout the country expressions of opinion as to fabrics, colorings and styles for overcoatings and men's wear suitings. The following questions were asked:

OVERCOATINGS FOR HEAVY WEIGHT SEASON 1913

A. Is the trend toward rough or smooth goods?
B. Solid colors, mixtures or fancies?
C. What fabrics will be most in demand?
   Worsteds, fancy or plain?
   Carded woolens, fancy or plain?
   Chinchillas?
   Meltons?
   Kerseys?
   Cheviots?
   Friezes?
D. What will be the desirable colorings?
E. Will plaid backs be popular?
F. Additional suggestions.

MEN'S WEAR SUITINGS FOR HEAVY WEIGHT SEASON 1913

A. Is the trend towards smooth or rough finish?
B. Worsted or carded woolen?
C. Fabrics?
   Serges?
   Thibets?
   Fancy worsteds?
   Cotton warp worsteds?
   Carded woolen cassimeres?
   Carded woolen cheviots?
D. Plain or fancy?
E. If fancy, whether stripes, plaids or checks?
F. If plain, whether solid colors or mixtures?
G. What colorings will be most popular?
H. Additional suggestions.

In a few cases the names of the clothiers are withheld by request. A study of the individual expressions of opinion will be of more value to the manufacturer than any summary of the replies, because of the widely separated localities and the different classes of trade represented.

OVERCOATINGS FOR HEAVY WEIGHT SEASON 1913

L. & D. Adler, Baltimore, Md. (A) Smooth; (B) Solid colors and mixtures; (C) Plaid mixtures, meltons, kerseys, cheviots and friezes; (D) Grey, blue, brown, oxford; (E) Yes.

American Specialty Tailoring Co., New York. (A) Smooth; (B) Solids, mixtures and fancies; (C) Meltons, kerseys and cheviots; (D) Brown, grey, tan and oxford; (E) No.

Ansorge Bros. & Co., New York. (A) Smooth; (B) Solid; (C) More conservative patterns and many solid greys in worsteds, chinchillas, meltons, kerseys and cheviots; (D) Grey; (E) Yes.

Bloomenthal & Son, Chicago, Ill. (B) Solid; (C) Plain worsted and carded woolen, chinchilla, melton and kersey; (D) Grey and Brown; (E) Yes.

Cleveland Worsted Mills, Cleveland, Tenn. (C) Carded woolen and worsted; (D) Greys, oxfords, blue and tans; (E) Yes.

Cohen & Levison, New York. (A) Rough; (B) Fancy; (C) Chinchilla and cheviots; (D) Grey.

Eklund Clothing Co., Minneapolis, Minn. (A) Rough; (B) Solid; (C) Chinchilla, melton and cheviots.

Samuel Fine, New York. (A) Rough; (B) Mixtures; (C) Fancy worsted and carded woolen, chinchilla, melton and kersey; (D) Grey; (E) Yes.

Sam Finkelstein Co., New York. (C) Fancy worsted and carded woolen and kerseys; (E) No.

Globe Clothing Co., Richmond, Va. (A) Rough; (B) Mixture; (C) Fancy worsted, cheviots and friezes; (D) Dark grey and brown; (E) No.

S. Goldheim & Sons, Washington, D. C. (A) Smooth; (B) Solid colors; (C) Plain carded woolens, chinchillas, kerseys and friezes; (D) Grey and staples; (E) Moderately.

William P. Goldman & Bros., New York. (A) Smooth; (B) Solid and fancies; (C) Plain worsteds, chinchillas, meltons, kerseys; (D) Tan, grey and brown; (E) Yes.

Goodman & Rothschild, Buffalo, N. Y. (C) Cheviots; (D) Grey and brown; (E) No.

Frank Grefig, New York. (A) Smooth; (B) Fancy; (C) Fancy worsted, kersey and cheviot; (D) Grey, brown.

Mark G. Harris & Co., Chicago, Ill. (A) Smooth and rough; (B) Solid; (C) Kersey, few cheviots and chinchillas; (D) Kerseys in solid colors, other goods grey and brown.

Edward Hart, Cincinnati, O. (A) Rough; (B) Fancy; (C) Fancy worsted and cheviots; (D) Grey; (E) No.

Hersberg & Co., Rochester, N. Y. (A) Smooth and some rough; (B) Solid and mixtures; (C) Neat effects in worsteds and carded woolens, meltons, kerseys and cheviots; (D) Grey and brown; (E) Yes.

Louis Holtz & Sons, Rochester, N. Y. (A) Smooth; (B) Mixtures; (C) Fancy carded woolens; (D) Grey; (E) No.

Huss Bros. Clothing Co., Cincinnati, O. (A) Smooth; (C) Fancy worsteds and carded woolens, meltons and kerseys. This being a middle west city and owing to heated street cars, buildings, etc., medium instead of heavy weight overcoatings and suitings are preferred.

Kentucky Clothing Co., Louisville, Ky. (A) Rough; (B) Mixtures; (C) Fancy worsteds and carded woolens, kerseys, few chinchillas and meltons; (D) Grey, tan, blue and few browns; (E) Very little.

M. Kory & Son, St. Louis. Mo. (A) Smooth; (B) Fancy; (C) Fancy carded woolen, cheviot; (D) Grey and black; (E) No.

Knickerbocker Clothing Co., New York. (A) Rough; (B) Solid; (C) Plain worsted, kersey; (E) Yes.

Leon Clothing Co., New Orleans, La. (A) Rough; (B) Mixtures.

S. D. Levy, New York. (A) Smooth; (B) Mixture; (C) Plain carded woolen, chinchillas, few kerseys and meltons; (D) Grey and tan; (E) Yes.

Light & Schlesinger, New York. (A) Smooth; (B) Conservative shades and patterns; (C) Plain carded woolen, melton and kersey; (D) Oxford, grey, brown and black; (E) In some sections, South and on the coast chiefly.

Edward Littleton, Des Moines, Ia. (A) Rough; (B) Solid; (C) Fancy worsted, kersey.

Oppenheim Co., Trenton, N. J. (A) Rough; (B) Mixtures and fancy; (C) Fancy worsted; (E) Yes.

M. Oppenheimer & Co., Pittsburg, Pa. (A) Rough; (B) Fancy; (C) Fancy and plain cheviots; (D) Tan, grey and oxford; (E) No.

Philip Resler & Sons, Minneapolis, Minn. (A) Smooth; (B) Mixtures; (D) Various shades of grey; (E) No.

Felix Rothschild, Chicago, Ill. (A) Smooth; (B) Solid; (C) Plain worsted, fancy carded woolen and cheviot; (D) Brown and blue; (E) Yes.

Saffer Bros., New York. (A) Smooth; (B) Solid colors and fancies; (C) Fancy worsted and carded woolens, meltons, kerseys, friezes; (D) Blue and light grey; (E) No.

Shearer Bros., Lynchburg, Va. (C) Cheviots and kerseys; (D) Mixed greys; (E) Yes.

A. Sitron & Co., Chicago, Ill. (A) Rough; (B) Mixtures and fancies: (C) Plain worsted and carded woolen, chinchillas; (D) Greys; (E) Yes.

Stiles Tailoring Co., Chicago, Ill. (A) Rough; (B) Mixtures; (D) Grey and black mixtures.

Washington Clothing Co., New York. (A) Rough; (B) Mixturts; (C) Fancy worsted, cheviots and friezes; (D) Grey, brown and olive; (E) Yes.

Warner & Bailey Co., Hartford, Conn. (A) Rough; (B) Mixtures; (C) Fancy carded woolens and chinchilla; (D) Blues in meltons and chinchillas; (E) Only in the finest grades.

Whitney Tailoring Co., Chicago, Ill. (A) Smooth; (B) Solid colors, mixtures and friezes; (C) Plain and fancy woolens and carded woolens, chinchillas; (D) Grey, brown and tan; (E) No.

J. Witkowsky, Chicago, Ill. (A) Smooth; (B) Mixtures and fancies; (C) Plain worsteds, fancy carded woolens, kerseys; (D) Grey, brown; (E) Medium popular.

Ernest Wolff Mfg. Co., Kansas City, Mo. (A) Rough and smooth; (B) Solid colors and fancy; (C) Plain worsted; (D) Meltons and kerseys; (D) Brown.

1. (A) Rough; (B) Mixtures; (C) Fancy worsteds; (D) Grey, tan, olive brown, grey brown; (E) Yes.

2. (A) Smooth; (B) Mixtures; (C) Fancy worsteds and carded woolens; (D) Dark mixtures.

3. (A) Smooth; (B) Fancy; (C) Fancy cassimeres, fancy carded woolens; (D) Brown and grey; (E) No.

4. (C) Chinchilla; (D) Grey; (E) Yes.

5. (A) Rough; (B) Solid colors, mixtures and fancy; (C) Worsted and carded woolens, chinchillas and cheviots; (D) Brown, blue and grey; (E) Yes.

6. (A) Smooth; (B) Dark subdued effects; (C) Plain carded woolens, chinchillas and friezes; (D) Any dark combinations; (E) No.

7. (A) Rough; (B) Mixtures; (C) Carded woolen; (D) Grev and brown; (E) No.

MEN'S WEAR SUITINGS FOR HEAVY WEIGHT SEASON OF 1913

American Specialty Tailoring Co., New York. (A) Smooth; (B) Worsted and carded woolen; (C) Serge, thibets and fancy worsteds; (D) Plain and fancy; (E) Stripes; (G) Blue, brown, grey and black.

Ansorge Bros. & Co., New York. (A) Smooth; (B) Worsted; (C) Serges, fancy worsteds, carded woolen, cassimeres, carded woolen cheviots; (D) Plain; (E) Neat stripes, very few diagonals; (F) Mixtures and solid greys; (G) Greys, olive browns and tans.

Bloomenthal & Sons, Chicago, Ill. (A) Smooth; (E) Checks; (F) Plain and solid colors.

Cleveland Woolen Mills, Cleveland, Tenn. (C) Cassimeres, plain twills and mixtures. Stripings in neat, fine effects will have their usual good demand; (G) grey blues, golden browns and tans. Manufacturers of low grade and medium all worsted serges cannot make and sell fabrics at a price of within 10 cents a yard of that of a year ago, owing to the fact that B super wools are extremely high and in good demand. For this reason cotton warp and worsted filled manipu-

lated serges will be in good demand as well as fancies.

Cohen & Levison, New York. (A) Rough; (C) Serges, Fancy worsted.

Eklund Clothing Co., Minneapolis, Minn. (A) Smooth; (B) Worsted; (C) Serges, fancy worsted, carded woolen cassimeres.

Feder-Silberberg Co., Cincinnati, O. (A) Smooth; (B) Woolen and worsted; (C) Serges, fancy worsteds, carded woolen cassimeres; (D) Plain mixtures; (F) Mixtures; (G) Dark grey and dark brown.

Samuel Fine, New York. (A) Smooth; (B) Worsteds; (C) Fancy worsteds; (D) Fancy; (E) Stripes; (F) Mixtures; (G) Grey.

Sam Finkelstein Co., New York. (A) Smooth; (B) Worsted; (C) Serges, fancy worsted; (E) Stripes; (F) Solid colors and mixtures; (G) Fancy.

Globe Clothing Co., Richmond, Va. (A) Rough; (B) Worsted; (C) Serges, fancy worsteds, carded woolen cassimeres, carded woolen cheviots; (D) Fancy; (E) Plaids and checks; (F) Mixtures; (G) Variety.

S. Goldheim & Sons, Washington, D. C. (A) Smooth; (B) Worsted; (C) Serges, fancy worsteds, carded woolen cassimeres; (D) Fancy; (E) Stripes; (F) Mixtures; (G) Brown and grey.

William P. Goldman & Bros., New York. (A) Smooth; (B) Worsteds; (C) Serges, fancy worsted, cotton warp worsted, carded woolen cassimere; (D) Plain; (F) Solid colors; (G) Brown and dark grey, also silk mixtures.

Goodman & Rothschild, Buffalo, N. Y. (A) Smooth and rough; (B) Worsted and carded woolen; (C) Serges, fancy worsteds, carded woolen cassimere; (D) Plain and fancy; (E) Mixtures; (G) Grey, brown and blue.

Mark G. Harris & Co., Chicago, Ill. (A) Smooth; (B) Worsted; (C) Fancy worsteds, blue serges, and cheviots; (D) Fancy; (G) Grey and brown.

Edward Hart, Cincinnati, O. (A) Rough; (B) Carded woolen; (C) Serges, thibets, carded woolen cheviots; (D) Fancy; (E) Checks.

Hershberg & Co., Rochester, N. Y. (A) Smooth; (B) Worsted and carded woolen; (C) Serges, thibets, fancy worsteds, carded woolen cassimere; (D) Plain and fancy; (E) Neat stripes and checks; (F) Solid colors and mixtures; (G) Greys and browns.

Louis Holz & Sons, Rochester, N. Y. (A) Rough; (B) Woolen; (C) Serges; (D) Fancy; (G) Grey and brown.

Hopkins Tailoring Co., Baltimore, Md. (A) Smooth; (B) Worsted; (C) Serges, fancy worsted; (D) Fancy; (E) Stripes; (G) Brown.

Huss Bros. Clothing Co., Cincinnati, O. (A) Smooth; (B) Worsted; (C) Serges, fancy worsteds; (D) Fancy; (G) Popular colors spring up suddenly.

Kentucky Clothing Co., Louisville, Ky. (A) Smooth; (B) Worsted; (C) Fancy worsteds, cotton warp worsteds; (D) Fancy; (E) Pencil stripes and checks; (F) Grey, tan, blue and black.

Knickerbocker Clothing Co., New York. (A) Smooth; (B) Worsted; (C) Serges, fancy worsteds; (D) Plain; (G) Solid Colors.

M. Kory & Son, St. Louis, Mo. (B) Worsted; (C) Serges, fancy worsteds, carded woolen cassimere; (D) Fancy; (E) Stripes; (G) Blue.

Leon Clothing Co., New Orleans, La. (A) Smooth; (B) Worsted; (C) Serges and fancy worsteds; (E) Stripes; (F) Mixtures.

S. D. Levy, New York. (A) Smooth; (B) Worsted; (C) Serges, fancy worsted; (D) Plain; (F) Mixtures; (G) Grey, tan and brown.

Light & Schlesinger, New York. (A) Smooth; (B) Worsted; (C) Serge, fancy worsted, carded woolen cassimere; (D) Medium; (E) Stripes and twills; (F) Solid colors and mixtures; (G) Grey, blue, black, oxford, brown and tan.

Ed. Littleton, Des Moines, Ia. (A) Rough; (B) Worsteds; (C) Serges, fancy worsteds; (D) Plain; (F) Mixtures; (G) Dark greys.

Charles E. Morris & Co., Philadelphia, Pa. (A) Smooth; (B) Worsted; (C) Serges, fancy worsteds; (D) Fancy; (E) Neat checks and stripes; (G) Brown and grey.

M. Oppenheimer & Co., Pittsburg, Pa. (A) Smooth; (B) Worsted; (C) Serges, fancy worsteds, some carded woolen cassimeres and some cotton warp worsteds; (D) Plain; (F) Solid colors and mixtures; (G) Grey and brown.

Oppenheimer Co., Trenton, N. J. (A) Rough; (C) Fancy worsteds; (D) Fancy; (E) Checks.

Philip Resler & Sons, Minneapolis, Minn. (A) Smooth; (B) Worsteds; (C) Serge, fancy worsted; (E) Stripes; (F) Mixtures; (G) Blues and browns.

Felix Rothschild & Co., Chicago, Ill. (A) Smooth; (B) Worsted and carded woolen; (C) Serge, cotton warp worsted; (D) Plain.

Saffer Bros., New York. (A) Smooth; (B) Carded woolen; (C) Serge, fancy worsted, carded woolen cassimeres, cheviots; (D) Fancy; (E) Plaids and checks; (G) Blue, light brown and light wine.

A. Shirek & Sons, San Francisco, Cal. (A) Rough; (B) Carded woolen; (C) Serge and carded woolen cheviot; (D) Plain; (F) Solid colors and mixtures; (G) Grey, brown and blue.

A. Sitron & Bro., Chicago, Ill. (A) Rough; (B) Worsted; (C) Serge, carded woolen cheviots; (D) Plain; (E) Solid colors; (G) Greys.

Stiles Tailoring Co., Chicago, Ill. (A) Rough; (C) Serge; (E) Mixtures; (G) Grey and brown.

Washington Clothing Co., New York. (A) Rough; (C) Serge, fancy worsted; (D) Plaids and checks; (E) Mixtures; (F) Grey, blue and brown.

The Werner & Bailey Co., Hartford, Conn. (A) Clean finish worsteds in inexpensive lines, cheviots in fine work; (C) Serges, thibets in the cheaper grades, worsted, carded woolen, cassimeres and cheviots in the better qualities; (E) Small plaids and checks; (G) Grey, dark mixtures and possible green shades.

Whitney Tailoring Co., Chicago, Ill. (A) Smooth; (B) Worsted and carded woolen; (C) Serge, fancy worsted; (D) Fancy; (E) Stripes; (F) Solid colors; (G) Grey, brown and blue.

J. Witkowsky, Chicago, Ill. (A) Smooth; (B) Worsted; (C) Serge, fancy worsted, carded woolen cassimere; (D) Fancy; (E) Stripes; (F) Mixtures; (G) Grey, brown and blue.

Ernest Wolff Mfg. Co., Kansas City, Mo. (A) Smooth; (B) Worsted; (C) Blue serge, fancy worsted, few cotton warp worsteds; (E) Stripes; (G) Tans and browns.

(8) (A) Rough; (B) Worsted; (C) Serge, fancy

worsted; (D) Fancy; (E) Checks; (F) Grey and olive dark mixtures, dark brown and olive green with brown cast will be popular in checks, black and blue in stripes, and solid mixtures of brown, olive and green shades.

(9) (A) Smooth; (B) Worsted; (C) Serge, fancy worsted, cotton warp worsted; (D) Plain and fancy; (E) Stripes; (F) Solid colors and mixtures; (G) Blue, black, brown, tan and grey.

10. (A) Smooth; (C) Serge, fancy worsted, carded woolen cassimeres; (D) On the conservative; (E) Stripes; (F) Mixtures.

11. (A) Smooth; (B) Worsted; (C) Serge, fancy worsted, cassimeres: (E) Stripes; (G) Blue.

12. (C) Serge, fancy worsted, cotton warp worsted: (F) Mixtures.

13. (A) Rough; (B) Worsted and carded woolen; (C) Serge, fancy worsted, carded woolen cassimere, carded woolen cheviots; (D) Plain and fancy; (G) Brown, blue and grey.

14. (A) Rough; (B) If the price of worsted remains high, wool must be used, in which case cassimeres as well as cheviots would be popular; (E) Pin checks, shepherd plaids and broken diagonals in small effects; (G) Grey.

15. (A) Smooth; (B) Carded woolen; (C) Carded woolen cassimere and cheviot; (D) Fancy; (E) Stripes and checks; (G) Brown and grey.

A Wool Buyer in the Southwest

By Our Special Correspondent

The wool season for 1912 started in February when the uneasy wool men began to contract for the wools of Nevada and Utah. Many million pounds of the Utah and western Colorado wools were contracted for around 14 to 15 cents and by the time the sheep were ready to be shorn at least 75 to 80 per cent. of the Utah wools had been spoken for. The wools proved to be in unusually light condition and such clips as had not been bought were sold at two or three cents advance over the contracted wools. Several million pounds of the Nevada wools were sold at 12 1/2 to 15 cents. The condition of these wools was a distinct disappointment to the contractors as they were heavier than expected. It looked early in the season like a losing business, but later market developments and an advancing market changed this to a profitable operation.

Arizona, which usually starts shearing in January, was late owing to the ususual dry weather which prevented the sheep men from driving their flocks across the desert to the south, where the shearing usually takes place. A few of the herds were shorn early, but the shearing of the bulk of the sheep was not begun until March and it was well into April before the work was going full swing. After the rains did come there was so much of it that this also held things back. The delay made the wools of a longer staple than usual and the rain improved their condition. The wools from this section were mostly consigned; although a few clips which were contracted for early let the buyers in a little. For the most part the buyers went through the farce of sealed bids only to be told at the finish that the wools were to be consigned. These wools netted the owners around 18 cents.

As the season advanced prices in all sections became stronger until it was no uncommon thing to hear of Wyoming and New Mexican wools selling freely on a basis of 55 to 58 cents clean, delivered in Boston. One peculiar thing about the operation was the rapidity with which the wools were absorbed by the dealers at a clean basis of several cents higher than the year previous, this in the face of unsettled political conditions and a near approach to tariff changes. The dealers had their nerve all with them,

WOOL TEAMS STARTING FOR MARKET, 60 MILES AWAY.

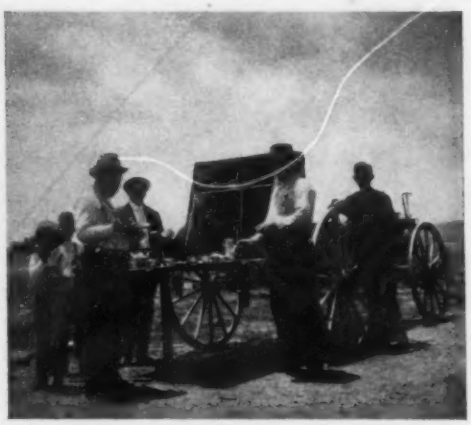
and took wools freely so that by August first the western part of the country was bare of all wool, more so than it has ever been at this time. Losses which the flocks of Wyoming, southern Colorado and parts of New Mexico suffered during the winter are estimated to reduce the United States wool clip about 15 per cent. from the figures of 1911.

Months might be spent profitably in the interesting Southwest, visiting the wonders

SHEARER'S CAMP. NOTE THE KITCHEN CABINET AT THE RIGHT.

of nature which abound there, passing through the Indian settlements and viewing at first hand the quaint life of these interesting people, who although only Indians have a civilization dating back centuries before America was discovered. They are an industrious and hardworking people and many are well off in this world's goods, owning large flocks of sheep and other range animals. From Holbrook, Arizona, the petrified forest is easily reached and several visits can profitably be made to this large tract, showing the trees of stone which must have laid thousands of years and taken countless ages to petrify. About sixty miles from this dead forest one is surprised to learn of a living forest of pine which is the largest in the United States, if not in the world. This has a width of forty miles and is two hundred miles long. The ripened timber of many million feet has been sold by the government and a railroad is projected to bring the lumber out in the shape of boards after the road and saw mills are established.

The volcanic character of the country about Arizona may be noted by the immense deposits of lava as well as by the cracks in the earth. In one place the earth is badly cracked. Some of the cracks are five miles in length and wide enough to insert the hand and in some places two feet wide. A stone thrown into one of the crevices may be heard to fall a great distance, while if the ear is placed near the crevice a roaring, rushing sound is heard, like wind or water. Montezuma's well is about forty-three miles from Prescott. This is the only well of its kind in the world. No one knows how deep the water is as sounding lines have been put down 380 feet without touching bottom. The well is situated on the top of a hill of stone about one hundred feet high. On the side of the well there is a narrow high wall of rock one hundred feet wide at the base and less than twenty at the top to preserve the well. One of the interesting things about western travel is the meeting of the old



CAMP DINNER AT THE "CHUCK" WAGON.

timer who first came to the country driving an ox team years before the railroad came. Those who are left are mostly well off and when they can be induced to talk tell wonderfully exciting stories of Indians and outlaws. In the early days every man was a law unto himself and defended his rights and his life at the point of a gun.

The Mexicans who do the bulk of the shearing in New Mexico and Arizona are a

happy lot. The shearing season is to them the time of milk and honey when they get real money and plenty to eat. Some of them overdo the latter and there are many cases of severe indigestion until they get accustomed to the hearty meals. At one camp a shearer had eaten too freely of fresh killed meat and was in terrible distress. He was sure he was dying and called the patron to make his will, which was done between groans. The man with the camera was in great demand while his films lasted, and the men were as eager as children to pose and the whole outfit wanted their pictures taken singly and in groups. They would stand or sit on their horses like insurecto generals with all the airs and graces of a Spanish cavalier.

The patron who contracts to do the shearing charges 5 1/2 cents a head for each sheep. He deducts 1 1/2 cents per sheep for each man's board, so each man received 4 cents per head. and his day's work is usually

JUST ARRIVED FROM THE RANGE.

about 50 heads. They talk and laugh at their work. When one man says something they consider funny, another man may start to howl like a wolf, then another will take it up, until the whole outfit is howling like a pack of wolves. They are ignorant and childish. In one camp they could be seen wearing badges on their hats bearing the words, "Viva la revolution" or "Viva Orosco." A few declined to work until Orosco came to capture the United States, which feat they felt sure would be an easy matter, if it were not for the Texans. They have a wholesome fear of Texans and feel if they could "beat up" Texas the rest of the United States would be a simple matter.

Interesting experiments in breeding have been made in New Mexico and Texas by

THE BLUE CANON.

crossing Lincoln, Cotswold or Shropshire ewes with Kara Kei rams or Persians for the production of Persian lamb skins. The Kara Kui sheep produces a lamb that has a growth of what looks like fur, but in the mature sheep this becomes long and coarse wool suitable for carpets or rugs. Crossing the long, lustrous woolen ewe with the Kara Kui ram produces a fur bearing lamb whose skin greatly resembles Persian lamb or astrakhan, which results in a greater profit than the wool from the uncrossed sheep. In order to get this fur the lamb must be killed a few days after birth. The thoroughbred sheep of the Kara Kui have great endurance and one peculiar feature about them is that with good feed and water they develop tails that will weigh forty to fifty pounds. Their great endurance is what sustains them during periods of poor feed and lack of water, as they can go for many days without food or water and can range over dry country on which our native sheep would die.

The result of one crossing of Cotswold with a nearly full blooded Kara Kui buck produced lambs with a black curly fur on the astrakhan order. Both parents were white.

Only in one case was the lamb white and two or three out of the forty lambs were wine color. In Persia the most valuable skins are obtained by killing the ewe and taking the lamb unborn. Some of the experiments in this country have produced a skin worth $10 from a week old lamb. The jet black lambs with their white mothers make an interesting sight. At present the

THE U. S. MAIL CROSSING THE RIO MARCHO.

experiments are limited, but practical sheep men see a new field for their efforts in breeding lambs for the fur market.

One of the most interesting auto rides in New Mexico is over the United States mail route from Vaughn to Roswell, a distance of about a hundred miles. Leaving Vaughn at nine in the morning we are soon out of town and on our way across the desert. The road during the dry season is good and the car strikes a gait of twenty-five miles an hour, which is about the average rate for the trip. Not a sign of habitation is visible and for the first forty-five miles the car speeds along, coasting down one incline, rushing up another on the opposite slope, where from the tip of the hills one may see as far as the eye can reach, the ribbon of road winding snake-like in the distance. Occasionally a herd of horses or an antelope may be seen, and at times the automobile is racing with a coyote. It seems to be a ruling passion with the range animals, horses, antilopes or coyotes, to race with a car when they see one. They will run along parallel with the car, perhaps for half a mile, then suddenly change their course and cross the road directly in front of the car. The driver puts on full sped in an effort to run them down and the animals sometimes cross just a few yards ahead of the car as it rushes forward.

After about two hours rushing up and down the hills, one sees in the distance the roof of the half-way house, named by one of the cooks "Camp Needmore," as the camp is always in need of something from either end of the route. A short stop for water and we are off for the last fifty-six miles. We finally reach the river Marcho. Here the car crosses the usually dry river bed on an automobile bridge. This bridge is about sixty feet long and about an equal distance from the bed of the river, which is mostly rocks. The bridge consists of two troughs wide enough to fit the wheels. To appreciate thoroughly that this was not built especially for foot passengers, one must walk

CAMP NEEDMORE.

using one of the troughs which are hardly wide enough to allow one foot to slide along when pushed in a straight line. Walking across in its proper sense is too much of a balance feat and when about half way over one wishes himself safely on either side. Two of these bridges are crossed, as well as a number of cattle guards which are placed

at the fences to prevent cattle from changing pastures. During the rainy season this trip is difficult and sometimes dangerous. The roads become bogs in places, and crossing the bridges, or at any available crossing if the bridges have been washed away, is the work of hours. The mails have to be carried through and it takes quite an outfit to get them across. The cars are run as near to the banks of the stream as possible. A rope is thrown across from either side and each rope is attached to a mail sack. Men on the far side begin to pull it over, while the men on the delivery side hold tight their rope to keep the sacks from the water. If passengers desire to cross they are handled in the same way. First, however, they remove their clothing, sending the clothes across in a bundle like the mail sacks. Then if the man is timid and not a good swimmer, the ropes are tied under his arms and he is hauled through the water to the other side.

The automobile to the sheep and cattle men of the West has become a necessity. They have long distances to travel to their different camps and although the roads are poor in most cases they do not hesitate to send their cars over very rough country and so poor that an Easterner would declare them impossible. Roads in many places are nothing but two deep ruts and care has to be taken to avoid getting anchored on a high center, as this means considerable digging in hard earth to extricate the machine.

Among the many implements a careful autoist carries in that country is a spade and if one lands on a high place without one it means a long wait or plenty of hard work digging out with a pocket knife or of kicking holes in the earth with one's feet. Another pleasure is to get bogged down in the sticky adobe soil. If the machine happens to be without a jackscrew there is trouble. Even with one the job is none too easy or clean. It is considerable effort to jack up each wheel separately and pile rocks under each so that the machine can get a start over the brush road that also has to be built to dry land. This repeated several times in a day makes one feel like declining to pay for the ride. Auto rides through the mountains where the canon sides are not guarded by fences and not particularly well laid out are not places for anyone troubled with nerves.

MONTEZUMA'S WELL NEAR PRESCOTT, ARIZ.

Fifteen per cent. grades in places and along the edge of canons showing a drop of hundreds of feet, keep the nerves alive and the imagination working on pictures of what one would look like if any vital part of the machine was to break. Although the cliffs may be beautifully colored and the scenery picturesque, it takes several trips before one can take his eyes from the driver and to keep from looking for soft spots to jump for in case of accidents.

The celebration of the great and glorious Fourth is not confined to the shades of Bunker Hill or other parts of the East. Every town of any size arranges a program for the entertainment of the people within riding distance. The few merchants get together money enough for the prizes for the different events and for the barbeque. Everyone is welcome and expected to join in the festivities. Horse racing brings out all the local favorites and side bets. They have the track staked out and the men surely know what there is to know about riding and enter with great enthusiasm. Cattle roping is forbidden by law, but nothing was said about goats, so these animals are brought into use and prove lively antogonists for the boys. In the affair we expected to participate in someone hid the goats so there was nothing doing in that line. At noon the crowd moved up the hill to the barbeque where all feasted on beef and mutton and ice cream from the city. The preparation for the barbeque is most interesting. First an oblong pit is made about four feet deep, fifteen to twenty feet long and three feet wide. In this pit, for eight or ten hours, logs are kept burning until there is a great bed of hot ashes. When this is ready a wire net is stretched across, supported at intervals by poles. On this net the quarters of meat are placed and turned about every four hours. At this place three steers and six sheep were cooked and they were done to a turn in about eighteen hours. The meat was not very sightly when put on the table for carving, but certainly improves on acquaintance.

The evening was given up to dancing in the hall over the blacksmith shop, and this like the other sports was taken hold of vigorously and kept up late. All agreed that they sure did have a good time.

This picturesque and interesting country fades into insignificance when the word comes over the wire for the tired buyer to return home, and it does not take long to connect with the Limited for the country where the Mexican frijole has yet to be discovered, and the blart of the sheep is not heard in the land.

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THE SOUTHERN NEW ENGLAND TEXTILE CLUB

The twenty-fifth meeting of this club was held at the Pomham Club, Providence, R. I., on September 21. Nearly three hundred members and their guests were in attendance at this, the first meeting of the club since the election of new officers in June, which resulted as follows: Charles D. Robinson, president; Henry C. Dexter, vice-president, and Frederic L. Chase, secretary and treasurer. The new executive committee include Albert W. Dimmick, George P. Grant, Jr., Frederick W. Howe, Charles H. Holmes, George C. Hinckley, Alexander Makepeace, E. Russell Richardson and Robert Stewart.

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A NEW RUSSIAN FABRIC

A recent issue of the "Novae Vremya" contained an interview with M. Cheveline, an engineer who has discovered a method of obtaining by chemical means a flax fiber much finer than can be obtained by the ordinary methods of retting. The process has the advantage of giving less waste and permitting the use of both short and long fibers. It consists in treating flax first with alcohol, then with mineral oil and steam. The process was patented in 1902, and in 1911 a company called the Fibre Cheveline built at Oriekhovo, near Moscow, a large factory for manufacturing a fabric of linen and cotton by the new method. The new cloth costs 13 1/2 cents per yard as compared with 67 cents per yard for a competing fabric that is somewhat finer. The product of the new mill will be placed on the market in a few months. The enterprise has attracted the favorable attention of the Russian Cabinet.

A WEAVE FOR SPLIT GOODS

The illustrations show a weave recently patented in this country and which is designed for goods that are to be cut apart without presenting a raveling edge. A special arrangement of weave is provided which may be set diagonally across a strip of cloth or at any angle which will permit the severing of the cloth at that particular angle without causing a raveling edge. The weft threads are looped near the line of severance,

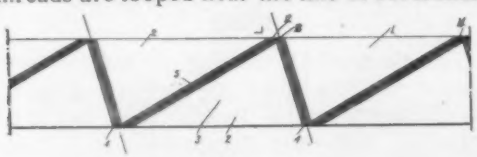
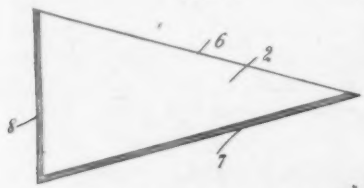


FIG. 1.

while the warp threads extend in a continuous line in the usual manner. In forming a diagonal weave designed to be severed, the weft thread is brought up to the point

FIG 2



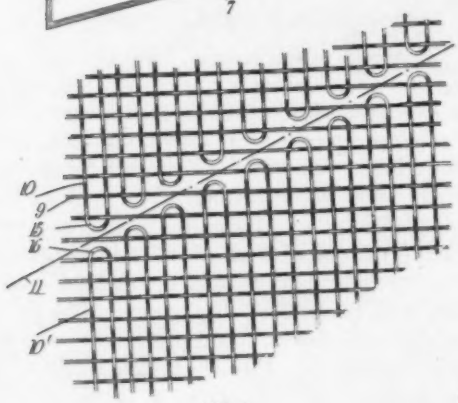


FIG. 3.

where it is designed to sever the cloth and then turned and caused to return. The next movement of the weft thread is shortened, and so on until that particular weft thread ceases to operate entirely. The opposite weft therad operates in an opposite manner, that is, each back and forth movement is lengthened, but is not caused to overlap the weft threads of the opposing shuttle, whereby there is a line in the cloth in which there is located no weft threads, but simply the usual warp threads. This permits the cloth to be cut at this point and in cutting only the warp threads are cut. The result is naturally that the edge will not ravel even though the same is diagonally arranged across the cloth.

Fig. 1 is a plan view of part of a strip of cloth or ribbon showing the construction; Fig. 2 shows a triangular piece of cloth cut out; and Fig. 3 shows the diagonal weave. The body, 3, of the triangular pieces, 2, may be formed in any desired manner, with weft and warp threads. The strip, 1, is woven at lines, 4, with the ordinary tight weave for forming substantially non-raveling edges. The lines, 4, are preferably arranged at a slight angle to the general direction of the strip. Extending from one end of one of the lines, 4, to the opposite end of the next adjoining line, 4, is a diagonal weave, 5, which can be severed centrally when the pieces, 2, are cut from the strip. The weave, 5, is arranged to be non-raveling so that when the pieces, 2, are cut from the strip, 1, they will have non-raveling edges, 6 and 7, without the necessity of binding.

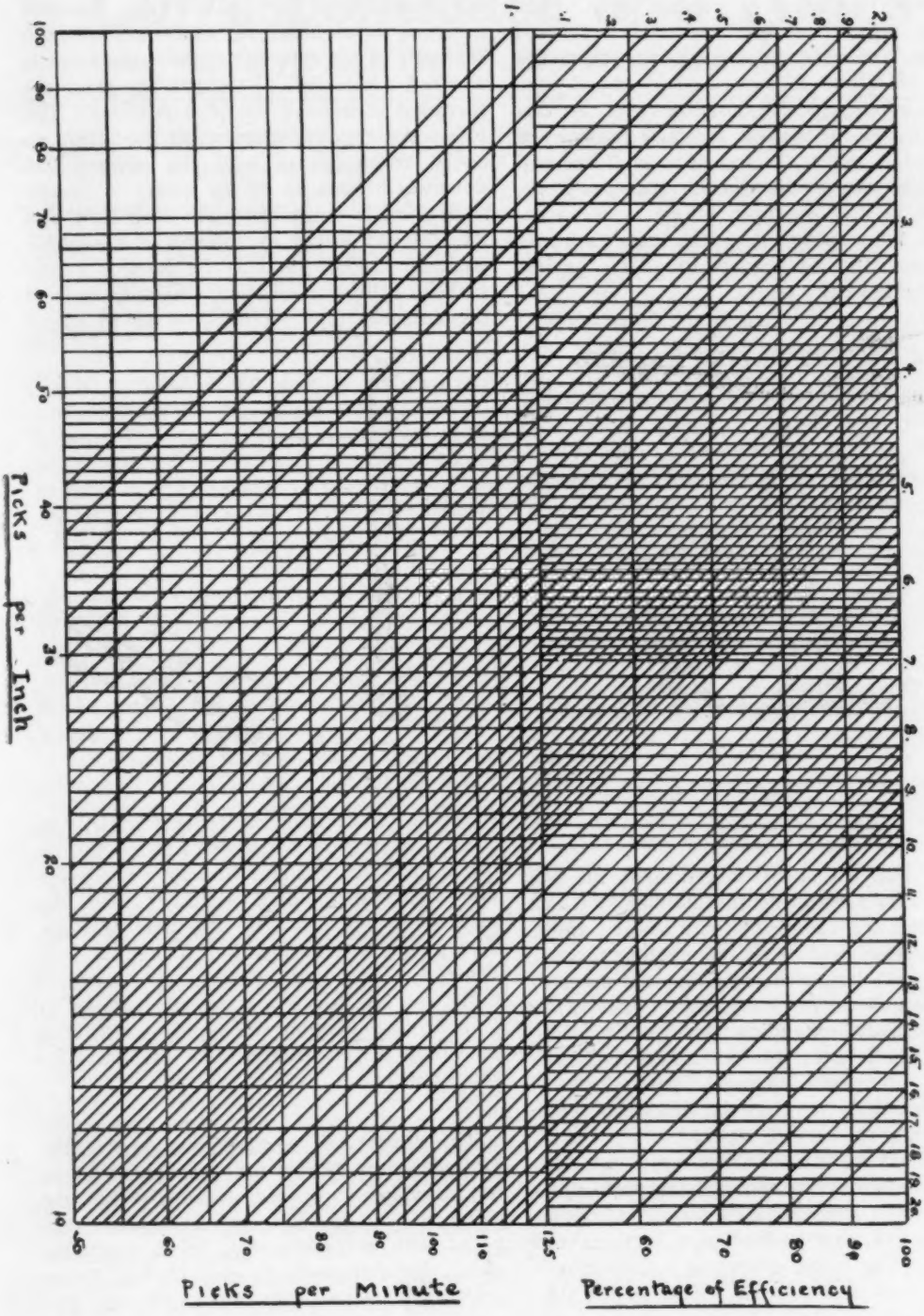
LOOM PRODUCTION AND EFFICIENCY

BY JOHN F. CROCKER

I recently made up the accompanying scale for our mill. We have found it so useful that it occurred to us to place it at the disposal of the textile trade through your columns. The scale is used for the calculation of production from looms as follows:

Fabric has 17 picks per inch.
Loom speed 90 picks per minute.
Loom efficiency 90% estimated.

Find the picks per inch on the lowest horizontal line and follow the vertical line upward from that point to where this vertical line is crossed by the horizontal line which represents the loom speed in picks per minute, as shown by the figures at the lower right hand of the scale. From this crossing point, the nearest diagonal line is followed upward to the left to the point where the


Production in Yards per Hour
J.T. Crocker
Cost Engineer
No. Andover, Mass.
Picks per Inch
Picks per Minute
Percentage of Efficiency

diagonal line meets a vertical line. Then follow this vertical line to where it is crossed by the horizontal line which represents the loom efficiency as expressed by the figures at the upper right hand of the scale. At this point follow the nearest diagonal line upward to the left and at the top horizontal line will be found the production in yards per hour, which in the example taken is 8 yards. When the production is less than 2.1 yards per hour, the figures are found at the left upper side of the scale.

A HOSIERY DRYING MACHINE

A machine for drying hosiery, which has recently been patented in this country, is shown in the accompanying illustrations. Fig. 1 shows the forms mounted on pipe sections. Fig. 2 is a cross section on the line 2-2 of Fig. 1, showing the manner in which the forms are adjusted to any desired angle. Fig. 3 shows one of the connecting fittings. Each of the hollow hosiery forms is made of cast metal, oval in cross-section, and with a longitudinally extending partition dividing the inclosed space into an upward passage and a downward passage, both of which communicate with a special fitting to which the base of the form is secured.

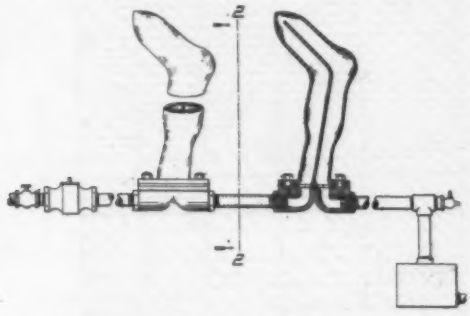


FIG. 1.

The heat is obtained from steam, which is furnished through a suitable pressure-reducing valve to a horizontally arranged conduit made up of aligned steam-pipe sections and of connecting fittings, carrying a corresponding number of the forms. Each of the special fittings has similar passage ways extending inward from its opposite ends, and terminating in right-angled exit ways through the wall of the fitting, to which the form is secured. The ends of the passage ways are threaded to receive the pipe sections. The exit ways are spaced apart on the fitting so as to communicate with the upward and downward passages of the form. A steam-tight joint is formed between each form and its attached fitting, by means of a suitable gasket. Each form may be turned, jointly with its fitting, upon the connecting ends of the adjacent pipe sections, so as to adjust the form to the most convenient angle, Fig. 2, for enabling the operator to board and remove the stockings after drying. The properly adjusted form is readily locked by means of a jam nut on the pipe sections. The piping and its attached forms are conveniently arranged above an operator's table, but the forms are directly carried by and adjustable upon the piping itself, thus providing a very simple and advantageous arrangement.

FIG. 2.

FIG. 3.

The exports of worsted coatings to the United States during 1911 decreased $293,017 in value compared with 1910, but the shipments of late years are insignificant compared with the years 1895, 1892, and 1889, when the shipments to the United States amounted, respectively, to $8,561,228, $5,302,701, and $6,564,304.

Correspondence and Notes

UPON TEXTILE TOPICS AT HOME AND ABROAD

TESTS FOR SILK

BY ROBERT DANTZER

[Translated from the French by the Editor of the Textile World Record.]

General. The various silks used in the industry are classified as follows: 1, Cultivated silk; 2, wild silk; 3, schappe silk; 4, artificial silk.

1. Cultivated silk from the silk worm "bombyx mori" is the most valuable variety, and includes yellow, white and green cocoons. The filament from silk worms of the same species varies with the country of origin. A large number of tests made at the Lyons conditioning house give the following results.

	Europe	Asia
Size average (diam. per in.)	.830	955
Strength (in grains)	148	114
Elasticity	12.5%	10.3%

The Asiatic silks of the same species are finer and possess less elasticity and strength than the European.

2. Wild silk, called tussah, is imported from Asia and is produced by the silk worm, "antheraea." The average diameter of the tussah filament is about three times that of the cultivated silk. The elasticity and strength are less. These silks are reeled in the same manner as bombyx silks.

3. Schappe yarn is manufactured from waste obtained from the cultivated and wild silks. There are several kinds of schappe: (a) produced from pierced cocoons and containing about 20 per cent. of silk glue; (b) obtained from waste filaments; (c) obtained from damaged cocoons; (d) white schappe, containing from 2 to 15 per cent. of silk glue; (e) having the silk glue completely removed and the color more or less grey; (f) consisting of very short filaments.

4. Artificial silks, of which the greater number consist of cellulose, are frequently employed in combination with natural silk. The artificial product is more lustrous than the natural, but is weakened when moistened.

DETERMINING THE VARIETY OF SILK

1. The microscope enables the variety of the silk to be determined by an examination of the section and profile.

2. The burning test is the simplest for distinguishing the natural and artificial silks. The artificial product burns rapidly, leaving no ash, while the natural silk burns more slowly, leaving a spongy residue and giving out an odor of burnt bone.

3. Cultivated and wild silks are distinguished by immersing a sample for one minute in a 4° to 5° Be. boiling solution of chloride of zinc. The mulberry silk is completely dissolved while the tussah is not sensibly affected.

4. Artificial silks are distinguished by their inferior strength, which is almost entirely lost when the silk is wet. A simple test consists of moistening the silk on the tongue and then stretching the thread. The natural silks resist while the artificial silk breaks.

5. Artificial silks are very sensitive to the action of silk. A sample of artificial silk which has been exposed to a temperature of 392° F. for ten minutes is reduced to dust by rubbing, whereas cultivated silk is uninjured.

6. Schappe silk cannot be distinguished from other silks by chemical tests, as the structure is identical. Schappe is, however, easily distinguished by carefully removing the twist from a sample of the yarn. The filaments in spun silk are continuous, whereas in schappe silk they are short. Mercerized cotton yarn has the appearance of silk, but is easily distinguished from the true silk by a close examination of the thread.

NATURAL SILK

The nature of the silk having been determined, the next step in a case of natural silk is to determine the condition. Natural silks

are found in commerce in the boiled off and raw state, this distinction depending on the presence of silk glue surrounding the original filament. The boiled-off silks, which are more brilliant, are the only ones possessing a particular cry when they are subjected to pressure or friction. The practice of weighting silk, which originated in 1825, has the advantage of swelling the filament and increasing both the weight and the strength of the raw silk. The luster, however, is somewhat reduced.

THE PHYSICAL EXAMINATION OF SILK

The twist in silk is very important and should be determined with precision. The raw silk filament is twisted, and then two or more of these filaments are twisted together. The cocoon filament, which appears to be single, is in reality composed of two filaments combined with a gummy substance which solidifies as soon as exposed to the air, and is known as silk glue. If a cocoon filament is boiled in a soap solution, the silk glue is dissolved and the two original filaments are separated. The quantity of silk glue in raw silk varies from 14 to 26 per cent of the weight. The raw silk of commerce is obtained by combining four to six cocoon filaments. The raw silk is distinguished by two numbers, one indicating the number of cocoon filaments used n producing the silk, and the other the minimum number. For example, a 4/5 raw silk is one wound from five cocoon, but during the winding process one filament may be missing in places.

Organzine consists of two or more strands of raw silk twisted in a direction contrary to the twist in the raw filament. The twist of organzine varies from 5 to 20 turns to the inch. If the twist is above 20 turns the yarn is called grenadine or crepe. Tram silk consists of two or more strands of raw silk united by a few turns of twist. The twist of tram varies from 2 1/2 to 5 turns per inch.

The twist of silk is determined by a twist counter of ordinary construction. Before testing the twist of silk the sample is wound on a flat plate and immersed in a boiling soap solution, then rinsed in luke warm water. After the twist is removed all but one of the ends are broken. The crank is then turned in the opposite direction until the cocoon filaments are parallel. The sample is then placed on a velvet cushion and the original filaments counted. In this way the number of cocoons used in reeling silk is determined. Knowing the count of the cocoon filament the count of the raw silk is determined by multiplying by the number of cocoons. The count of the cocoon filament varies with the kind of silk. The following table gives the approximate size for the leading varieties:

Origin	deniers
Spain	2.7
France	2.3
Italy	2.2
Syria	2.2
Caucasus	2.1
Broussa	2
Japan	1.9
China	1.8
Bengal	1.1

The above table shows that the count of a cocoon filament varies from 1 to 2.7 deniers; and in France the average is 2.3 deniers. This enables the count of raw silk to be determined very easily. It is necessary simply to multiply the average number of cocoon filaments by 2.3. Thus the count of 5/6 raw silk would be determined as follows: $5.5 \times 2.3 = 12.65$ deniers. The result thus obtained is only an approximation and generally varies two or three deniers, by reason of the irregularities of the cocoon filament. After counting the twist the silk is tested for strength on a special dynanometer, which indicates both the strength and elasticity. These last named tests are comparative, to show how the strength of a silk thread compares with that of another taken as a standard.

To complete the physical examination of the silk it is a good plan to have a collection of different kinds of silk. The comparison of the thread under examination, with the samples of known structure, is very simple and often of great value. The chemical

analysis which follows, is not only qualitative, that is, indicating the nature of the weighting materials, but in many cases is quantative, enabling the quantity of the weighting material to be determined.

CHEMICAL ANALYSIS

The high price of silk stimulates the practice of weighting, which is facilitated by the fact that the structure of the silk itself lends itself readily to adulteration. When the weighting materials are of vegetable or animal origin, they can be removed by boiling in a soap solution and are carried away with the silk glue. If, however, the silk is weighted with a mineral substance it cannot be removed by boiling. According to L. Vignon, mineral substances for weighting silk are recognized by burning. After boiling off the silk a small sample is burned in a porcelain holder, heated red hot for two hours, or until the ash contains no black particles. When cool the ash is weighed and if the weight exceeds .85 per cent. of the weight of the sample, the excess is due to the presence of a mineral weighting material. The nature of the weighting material employed is determined by chemical analysis necessitating a high degree of skill on the part of the operator. Most merchants and manufacturers have such tests made at the Lyons conditioning house at a cost of $2.50 per test.

The methods employed, which have been described by B. Martinou, vary with the condition of the silk, whether white, black or in colors.

A. White silk. The silk may be weighted with sugar or oxide of tin. A sample of the silk is immersed in four or five times its weight in hot water, then rinsed well in hot water and dried. The difference between the original weight and the weight after drying gives the quantity of sugar fixed on the fiber. The absorbent quality of the silk is determined as follows: Along with the sample to be tested a small skein of unweighted silk of the same quality is placed under a glass jar and at the end of an hour the two silks contain the same quantity of moisture and are weighed. The operations of analyzing the silk having been completed, the two skeins are rinsed together, dried and placed under the jar. At the end of half an hour the skein is weighed and the weight is generally less than the original weight. It is replaced under the jar and when the weight is equal to the primitive weight the skein that was tested is weighed. This method gives exact results and is much simpler than the ordinary conditioning process. In case the weight is reduced by the hot water process an examination of the first rinsing liquor is made. If it reduces Bareswill liquor immediately, glucose is present. If on the contrary, the reduction takes place only after boiling with an acid, sugar has been used for weighting. The liquor is also tested for sulphate of magnesia. When testing raw silk many different substances are found in the scouring liquor, these having been added during the reeling process for the purpose of increasing the weight of the silk. Starch is detected by the aid of the microscope and by the blue shade which is developed with tincture of iodine. Dextrine is identified by the wine color obtained with tincture of iodine, also by the tendency to be transformed into glucose by boiling with a dilute acid. The sulphates of soda and magnesia are detected by the action of a solution of chloride of barium and by the insolubility of the white precipitate in hydrochloric acid. Chloride of sodium is detected by the action of nitrate of soda.

When the silk does not lose weight by the treatment in hot water a sample is weighed and burned. The silks weighted with oxide of tin burn with difficulty, leaving an ash which retains after a fashion the exact form of the thread. The sample is burned either in the flame of an enameling lamp or in a furnace. It is necessary to avoid too high a temperature which causes a loss of the oxide of tin. The weight of the residue indicates the quantity of fixed oxide on the fiber. As the residue is in an anhydrous state while it is in the form of a hydrate on the silk, it is necessary to make an allowance for the water. L P represent the weight found. Then the weighting will be $P \times 1.113$. In

order to determine whether the residue is oxide of tin, it is dissolved in hydrochloric acid, either concentrated or hot. If tin is present the solution thus obtained gives all of the reactions of tin salts. If it is desired to dissolve completely the residue after burning in order to determine the quantity of tin, it is necessary to treat it with caustic soda, giving stannate of soda or to heat it in a closed tube with hydrochloric acid at about 300° F. The hydrochloric acid dissolves the oxide. The weighting being always calculated on the weight of the raw silk certain allowances must be made:

1. Boiled-off silk. Weighting with sugar: Let A represent the original weight of the silk and B the weight after treating with boiling water. As the silk has lost 25 per cent. in boiling off, $B \times 100 \div 75$ represents the corresponding weight of the boiled silk and $75A \div 100B$ gives the yield. After weighting with oxide of tin let A represent the original weight of the silk; P, the weight of the ash. The real weight of the silk will be $A - 1.113P$, and the corresponding raw silk will be $100 \times (A - 1.113P) \div 75$. The weighting of the silk will then be $75A \div 100 \times (A - 1.113P)$.

2. Souple silk. The loss of weight is more irregular than the loss by boiling off, depending on the extent to which the process is carried and the nature of the silk, but it averages about 7 per cent. In the case of weighting with sugar, $93A \div 100B$ gives the yield. If weighting with oxide of tin the yield is indicated by $93A \div 100 (A - 1.113P)$.

3. In testing raw silk it is evident that no correction is necessary. If weighting with sugar $A \div B$ gives the yield. For weighting with oxide of tin $A \div (A - 1.113P)$ gives the yield.

B. Silk in colors. These silks are charged with oxide of tin, tannin, or with both of these products. Incineration and weighing the ash will give the amount of fixed oxide of tin. It is necessary to test for tannin. A skein of silk is boiled in a small quantity of water, the hot liquor is poured from the silk, and after cooling a drop of dilute acetate of iron is added. A bluish black precipitate indicates weighting. It is necessary to avoid an excess of ferric salt because precipitates should not be formed. To determine the quantity of fixed tannin it is necessary to pass the silk for at least one-half hour through a boiling solution of soap and alkali. The silk being weighted before and after the operation, the loss of weight indicates the amount of tannin.

It is possible, however, that gelatin may have been present either as an original part of the silk glue or as fixed intentionally by passing the silk through a bath of gelatin after weighting. The yield of either souple or boiled-off silk is given by the formula, $75A \div 100B$. A is the original weight of the silk and B after passing through the boiling water. If oxide of tin is present along with tannin the yield will be $75A \div 100 (B - 1.113P)$. P is the weight of the ash, the other letters having the same meaning as in previous formulas. There may also be present oxide of chrome and oxide of iron. To determine the various proportions, a small quantity of caustic soda and several grains of nitrate of soda are added to the ash, which is then exposed to the flame of a Bunsen burner. Chrome and stannate of soda are formed. In order to make the reaction complete it is necessary to keep the mixture melted for ten to fifteen minutes. The mixture is then treated with water, and the insoluble residue is weighed. It consists of the oxide of iron which is found on the silk in the form of a hydrate. The oxide of tin is disclosed by adding an excess of hydrochloric acid and precipitating sulphate of tin mixed with the sulphur arising from the oxidation of the sulphuretted by a current of sulphuretted hydrogen. The hydrogen by the chromic acid is burned and weighed. Sesquioxide of chrome in the liquor obtained by the precipitation of tin can be determined by the ordinary process of analytical chemistry. The quantity of chrome can be determined by comparing the intensity of the color of the original solution of chromate with prepared solutions. The chrome is found on the silk in the form of sesquioxide. If the silk contains fatty matter a sample is treated with ether or sul-

phide of carbon in a Soxlet apparatus. The quantity of fatty matter, oxides of tin, iron and chrome having been found, the quantity of silk and tannin are easily determined. Then the quantity of silk is determined by a boiling soap solution.

4. Black silk. The analysis of black silk is more difficult and the results more uncertain. It may disclose oxide of tin, oxide of iron, cyanogen in the form of Prussian blue, tannin, fatty matter and various coloring materials. These substances are found in combination and their separation is difficult. It is necessary, first, to determine whether the silk has been treated with cyanogen. A sample is immersed in hydrochloric acid at 10° B. and heated to 120° or 140° F. In a short time most of the logwood fixed on the silk has been removed and the silk acquires a maroon shade, if it has not been exposed to the action of cyanogen. If the contrary is the case it assumes a bluish black shade. A sample is next rinsed and then boiled in a solution of caustic soda and filtered. The filtered liquor is acidulated and then a drop of perchloride of iron is added to precipitate the Prussian blue if any is present. The oxides of iron and tin and the fatty matters are then determined as already described. These operations indicate the manner in which the black has been produced, but do not give the yield which is obtained by treating a known weight, M, of the black silk, with acid and then alkaline solutions. The silk is passed successively through (1) a solution containing 20 parts of caustic soda in 1,000 parts, (2) a solution of hydrochlorite acid containing 250 parts of commercial acid to 1,000. A sample is left for an hour in each bath, care being taken to rinse well after each treatment. It is necessary to give it four passages through each bath. After the last bath the silk is a clear maroon and as it has lost all of its strength it is necessary to handle it very carefully. The dry silk is weighed, the weight being indicated by m. A part of the sample, p, is then weighed and burned and the weight of the residue is indicated by A. We now have A $\times$ 1.25, which represents the weight of the hydrous oxides of which the anhydrous weight is A. The weight of the boiled silk in the sample, p, will then be P — 1.25A. The weight of the raw silk will be 100 $\times$ (T — 1.25A) $\div$ 75. If this represents the raw silk contained in the sample, p, the raw silk in the sample, m, will be 100 m x (P — 1.25A) $\div$ 75p. The original weight being M, the yield will be 75 M p $\div$ 100 m x (P — 1.25A). The treatment with soda does not remove all of the mineral substances. It is, therefore, necessary to add from 10 to 15 per cent. to the yield.

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THE NEWCOMEN STEAM ENGINE

From the Manchester (Eng.) Guardian

The first practical machine which we may justifiably call a steam engine was erected by Thomas Newcomen at Dudley, in Worcestershire, two hundred years ago. It is true that Savery had built one or two steam pumps in the twelve or fourteen years preceding the setting to work of the Newcomen engine, but these were not piston engines. Dr. Papin had also experimented with engines, and had even tried pistons worked with steam, but without practical success. So that we may legitimately say that the Newcomen engine of 1712, though strictly an atmospheric engine, was the parent of all the countless steam engines which, by their influence through pumping, manufacture, and transport, have moulded the world as we know it today in some of its most important features. The commemoration of such a turning-point in the world's history and the provision of a suitable memorial to the Englishman who was the inventor and constructor of the first steam engine needs no apology. Dartmouth, the birthplace of Newcomen, is to be congratulated on initiating a proposal for such a memorial. It deserves, however, to be enlarged into something more nearly national in character, and in this work our premier engineering societies could fittingly lead.

Whilst honoring Newcomen we must recognize the work of his predecessors and contemporaries upon which to a considerable extent his own work was based. Galileo was

apparently convinced that air had weight, but it was reserved for his pupil Torricelli to construct a mercury barometer and, by comparing the heights of mercury and water barometers, to prove that the atmosphere had weight. The Torricellian experiment of 1643 led several philosophers to experiment, and in particular Otto von Guericke, Burgomaster of Magdeburg, made first an air pump for producing a vacuum and second a cylinder and piston machine which raised weights by allowing the atmospheric pressure to force down the piston when the underside was connected to a vacuous chamber. These experiments seem to have been made in 1654, and to have preceded Boyle's experiments with air pumps.

In 1678 Huyghens constructed a piston engine for raising weights by the pressure of the atmosphere, the partial vacuum under the piston being produced by an explosion of gunpowder, but it was Dr. Papin who made the first real advance by utilizing steam instead of gunpowder. Papin experimented in England and on the Continent, and deserves special mention because he consistently schemed to devise means of putting his inventions to practical uses, such as pumping and the production of a rotary motion which might be utilized for raising weights or driving machinery and even, as one of his experiments indicated, for propelling boats.

It was reserved for Thomas Savery, a native of Devon, to make the first useful steam pumps. Savery's patent is dated July 25, 1698, and it appears that his first pump was set to work about 1702. Although known as a "fire engine," the Savery pump was not an engine as we understand the term today. It was a steam pump without pistons or rams, and to that extent was similar to the modern pulsometer class of pump. Its limitations, however, were very narrow.

Returning to the Dudley Castle engine, a third feature, hardly less important than the piston and injection condensation, was the automatic valve gear. It is popularly believed that the self-acting gear was invented by a boy attendant named Potter, whose duty it was to turn the steam and injection cocks in proper sequence. The fact seems to be that this first engine had a self-acting gear operated by a float or "buoy" in a tube which was open at the top to the atmosphere and immersed at the other end in the boiler water. The steam pressure was practically atmospheric, but as it rose slightly it raised the water-level in the buoy pipe and with it the buoy, which in turn opened the steam cock. Another detail of interest is the

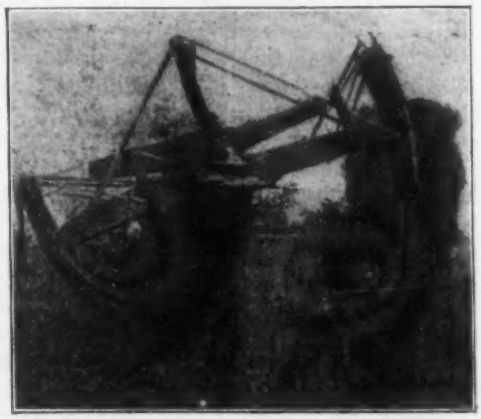


FIG. 1.

pump, driven by the main engine, for supplying the boiler and the injection water.

This engine was, like all the early examples, a pumping engine, and we are fortunate in possessing a careful perspective drawing of it dedicated to the knights, citizens, and burgesses of the county of Stafford by Tho. Barney. This drawing is entitled "The Steam Engine Near Dudley Castle, Invented by Captain Savery and Mr. Newcomen. Erected by ye later, 1712." From other sources it does not appear that Savery had anything to do with the design of this engine, or, indeed, that he ever departed from the type represented by his own steam pump, and it is probable that his name is coupled with Newcomen's as a matter of partnership courtesy and because of his patent relating to steam engines.

The engine at Dudley Castle was a striking departure from anything which had preceded it. Immediately over the boiler was the cylinder, arranged vertically and work-

ing on to one end of a rocking beam, the other end of which worked an ordinary mine or well pump. The two striking features, however, were the piston and the injection system of producing a vacuum under the piston. Papin had at first relied upon atmospheric cooling, but later appears to have suggested injection. It is, indeed, clear that had Papin been more intimately connected with industry he might possibly have been the designer of the first practical steam engine.

The above description, whilst not covering all the ingenious details, sufficiently proves the great advance which Newcomen effected, and it is not surprising that his engine soon found favor, especially in the colliery districts, where pumping was urgently needed and coal very cheap. In 1717 the engine had so far progressed that Henry Beighton published a table setting forth the proportions and duty for engines of various sizes to draw water from 15 to 100 yards, the cylinder diameters varying from nine to forty inches. One Newcomen engine at least was erected in the Manchester district, and the dilapidated remains, still in existence near Stalybridge, are shown in the illustrations. Fig. 1 shows the ruins of the engine as they appear today. Fig. 2 is from a photograph taken about 1893, and gives some idea of what the engine was like when it was working, which it ceased to do probably about eighty years ago. Of the further progress of the steam engine since Newcomen's day, it is not our purpose to speak, but it is worth emphasizing that, with the exception of the introduction of the steam turbine in recent years, all developments have been, as it were, almost consecutively and on lines which Newcomen's invention foreshadowed.

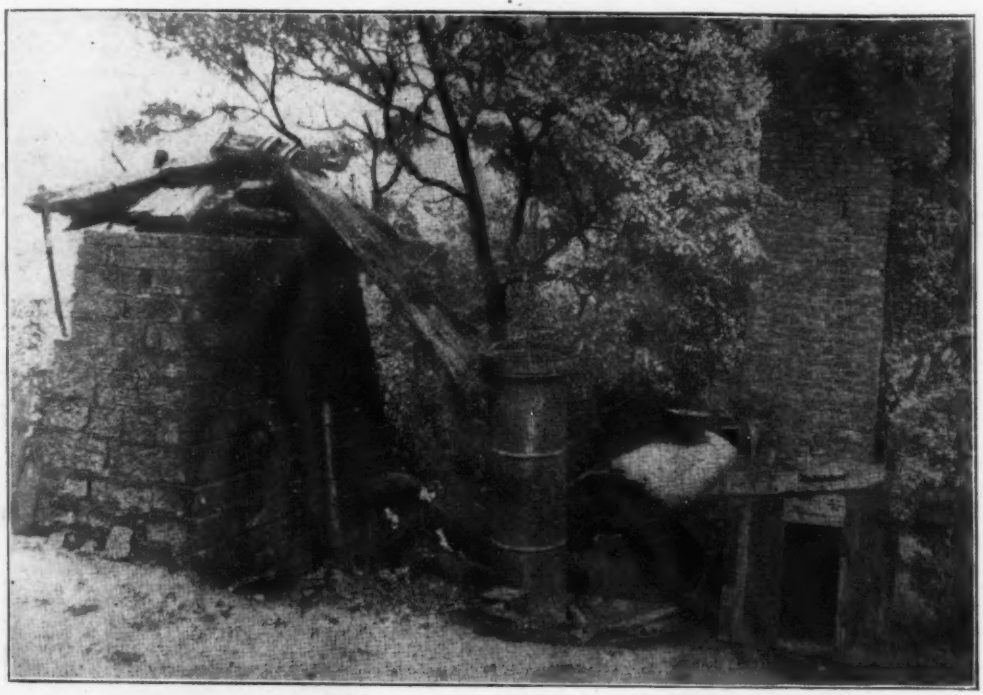


FIG. 2

The textile exports to the Philippine Islands from Bradford were valued at $14,326, against $18,007 for 1910, and consisted principally of cotton linings and noils.

A HAND BOOK OF WEAVES

By G. H. OELSNER, Director of the Weaving School at Werdau.

Translated and Revised by Samuel S. Dale

This Series began in July, 1911

Breaks or Recesses in the Cloth

In these weaves a break occurs at intervals where adjacent warp or filling threads are stitched in opposite order. The effect is most pronounced where the break is formed by two adjacent threads stitched with a plain weave, which separates them sharply, while the remainder of the weave allows the other threads to approach each other easily. The general character of these weaves is shown by Figs. 756 to 761. The breaks are indicated by short lines at the side and bottom. Examples on a somewhat larger scale are shown at Figs. 762 and 763.

FIG. 756.

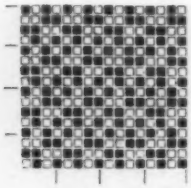


FIG. 757.

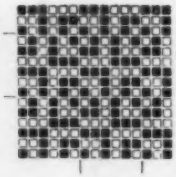
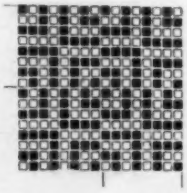


FIG. 758.



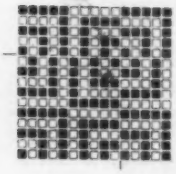


FIG. 759.

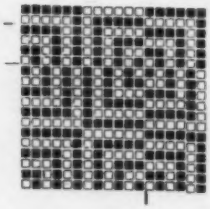


FIG. 760.

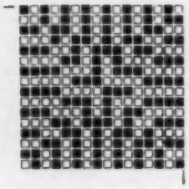


FIG. 761.

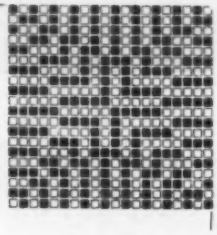


FIG. 762

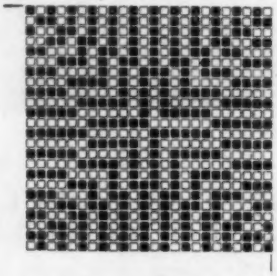


FIG. 763.

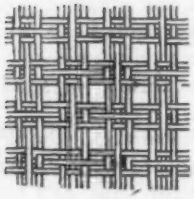


FIG. 764

FIG. 765

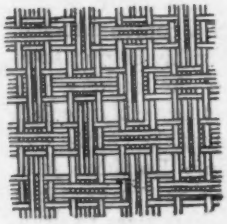


FIG. 766.

FIG 767.

(Copyright, 1912, by Samuel S. Dale.)

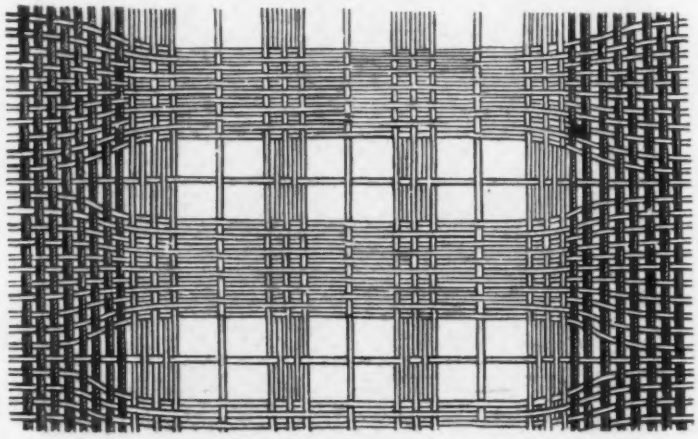
LACE OR MOCK LENO WEAVES

These weaves are designed to make apertures or open spaces in the cloth, and are called lace or mock leno weaves from their resemblance to lace and leno fabrics.

The mock weave is used chiefly for ladies' dress goods. The open or lace effect is often heightened by making the goods with a plain back of a contrasting color, which is seen through the openings in the face weave. A group of three or more warp or filling threads are interlaced in such a way that the threads of each group can come together easily in one bunch, while they are separated from the adjacent groups by reason of the last thread of one group and the first thread of the next group being interlaced in directly opposite order. Such an intersection prevents the two threads from coming together and causes an opening at this point.

A 6-leaf mock leno weave is shown at Fig. 765. The interlacing of the threads is illustrated at Fig. 764. As pick 2 floats under threads 1, 2 and 3, and over threads 4, 5 and 6, picks 1 and 3 are in the same shed and, consequently, approach each other so that picks 1, 2 and 3 are brought together in a bunch. Picks 4, 5 and 6 are likewise brought together because pick 5 floats over and under each successive group of 3 warp

FIG. 768.



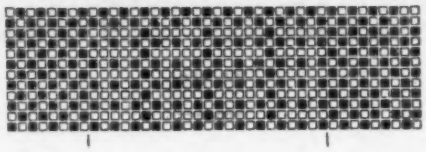


FIG. 769.

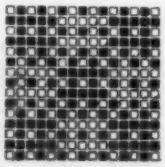


FIG. 770.

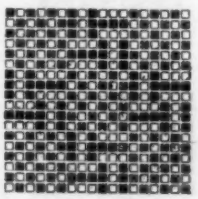


FIG. 771.

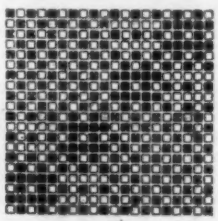


FIG. 772.

threads, allowing picks 4 and 6 to come together and form a group with pick 5. The two groups of 3 picks each are separated by the breaks in the weave between picks 3 and 4, and between picks 6 and 1, causing an open space in the cloth at each of these points.

The floating of warp threads 2 and 5 alternately under and over successive groups of 3 picks, together with the breaks between threads 3 and 4 and between threads 6 and 1, causes in like manner a slit or open space in the warp between threads 3 and 4 and between threads 6 and 1. These slits in the

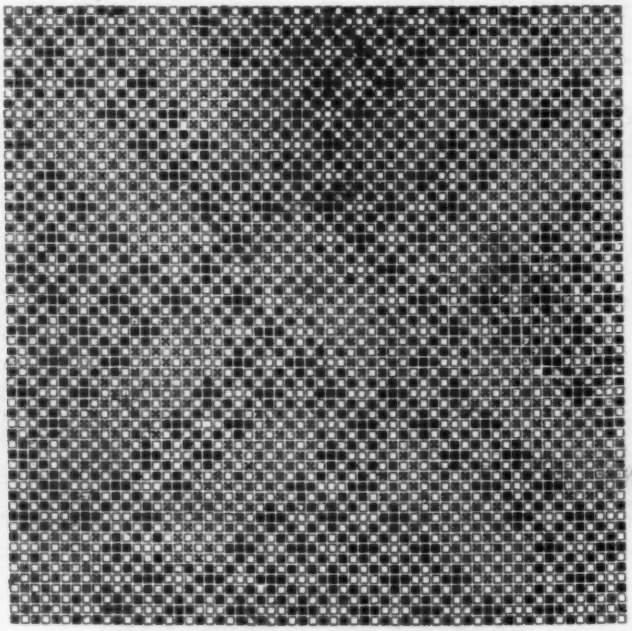


FIG. 773.

FIG. 774.

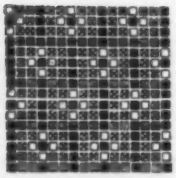


FIG. 775.

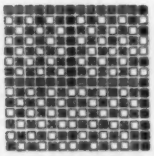
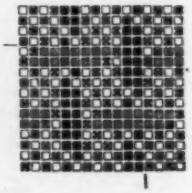


FIG. 776.



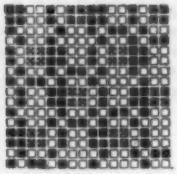


FIG. 777.

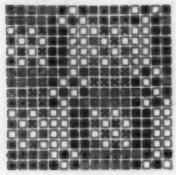


FIG. 778.

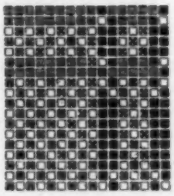
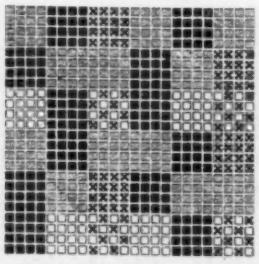


FIG. 779.

warp can be enlarged by reeding 3 threads in a dent and bringing wires of the reed be-

FIG. 780.



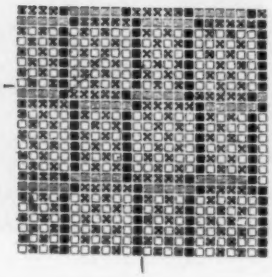
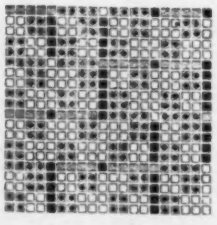


FIG. 782.

FIG. 784.



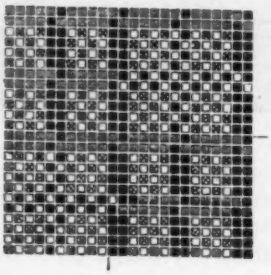
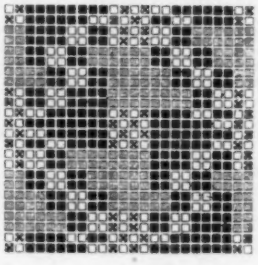


FIG. 787.

tween threads 3 and 4 and between threads 6 and 1. Skipping a dent at each of these points will enlarge still further the slit in the warp.

FIG. 781.



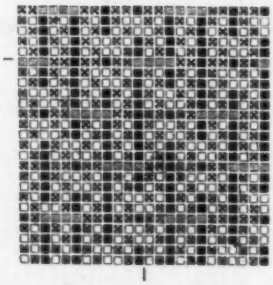
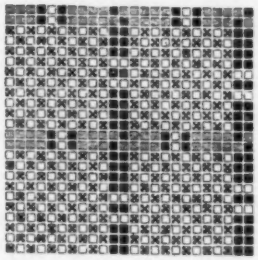


FIG. 783.

FIG. 785.

FIG. 786.



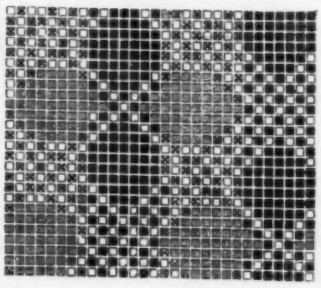


FIG. 788.

A 4 and 4 mock leno weave is shown at Figs. 766 and 767. From what has been

said regarding the 3 and 3 weave, Fig. 765, it is evident that the best effect will be obtained at Figs. 766 and 767 by reeding 4 threads in a dent and bringing a reed wire or empty dent between threads 4 and 5 and between threads 8 and 1.

A 5 and 5 mock leno weave is shown at Fig. 770.

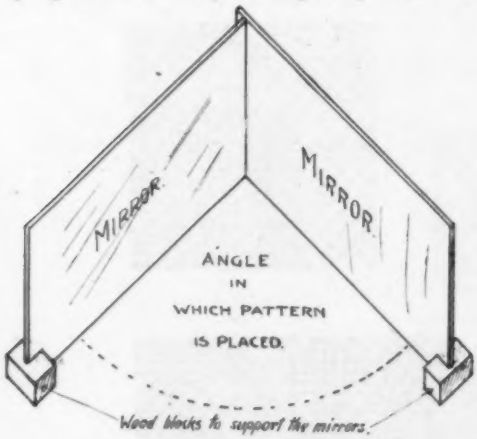
Fig. 769 shows a weave for the mock leno stripe effect, Fig. 768.

Very attractive patterns are obtained by combining these lace weaves with a plain ground weave, Figs. 771 to 773. Lace effects may also be obtained by weaving alternate groups of cotton and woolen threads in warp and filling, and afterward carbonizing the goods to remove the cotton.

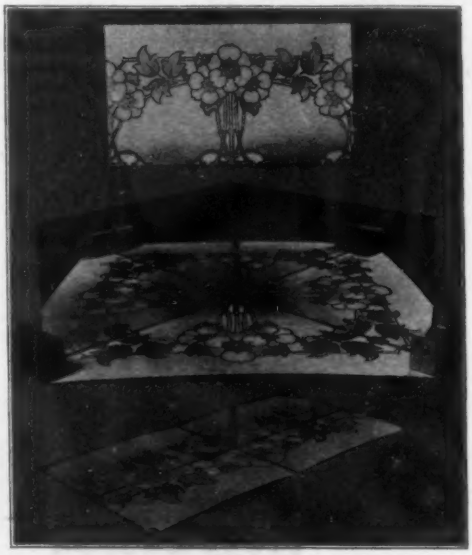
A SIMPLE METHOD FOR FIGURE DESIGNING

BY S. M. ART

The method herein described has not to my knowledge been published before. I have used it for some years, however, and found it a thoroughly practical system which deserves to be better known. Repeating figures are easily arranged by means of

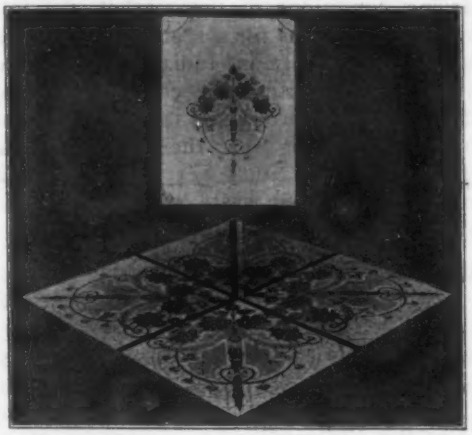


two pieces of mirror glass about 8 by 15 inches each, and any old wall-paper or other pattern. The two mirrors are held up on edge, at a suitable angle to each other, and moved about over the pattern, until out of the multiplicity of reflected images a satisfactory design is seen. The portion within the angle of the mirrors is then marked off and traced. The unit thus obtained may be enlarged, reduced or modified if desired and then repeated—as required to complete the design.

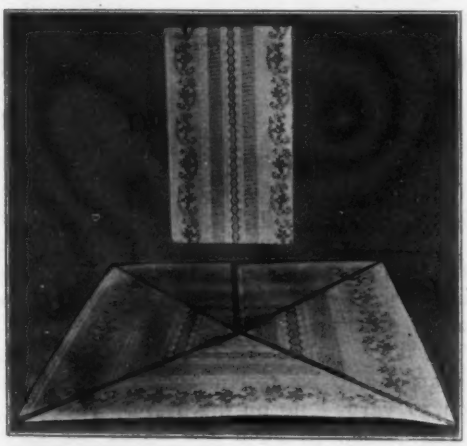


The variety of effects and ideas suggested by this method is perfectly astonishing, and anyone with the least knowledge of designing can at once produce novel and original compositions. With one piece of glass only, splendid spot pattern units can be evolved. With both mirrors, set at an angle of 30°,

60° or 90°—the latter is perhaps the most useful—designs are quickly produced for bedspreads, table cloths, centers, cushion covers, handkerchiefs and borders. For work outside textiles this is a valuable device. It effects a great saving of time in



the production of new designs. Suppose a design has been selected and modified, and is then drawn or painted up, it is often quite sufficient to finish one section only, as



by means of the mirrors the complete design may be reflected and studied. Any practical man can judge what the finished sketch would be. The illustrations, A, B, C and D are common wall-paper patterns from an obsolete book. The other photographs show what has been made from them without any modification whatever. The perspective view necessary in photographing the mirrored designs results in a loss of much of the charm of the designs themselves. Two blocks of wood grooved for the purpose hold the mirrors upright. They can be seen in the illustration, A 1, which is a suggestion for a small table-cover or cushion cover and is made from the wall-paper frieze, A. The figure, A 2, is a border of the turn-over or center-tie type, also made from A. A test of this method will prove its simplicity and quite startling efficiency.

A WOVEN FABRIC

The fabric shown in the accompanying illustration has recently been patented in this country and is described by the inventor as

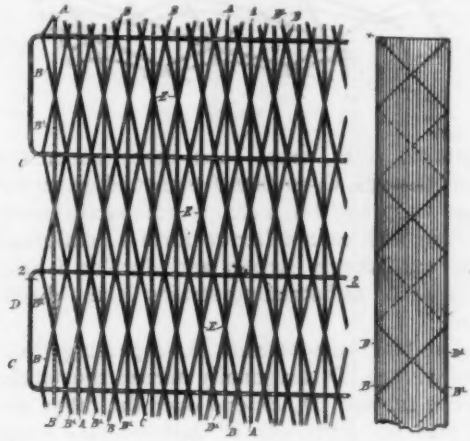
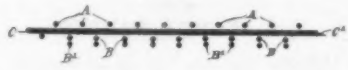


FIG 1. FIG. 4.

follows: The object is to provide a woven fabric, having interwoven bias or diagonal threads to reinforce the cloth. The fabric is formed of interwoven ground warp threads, bias warp threads and weft threads, of which the bias warp threads extend diagonally across the fabric from one selvage to the other. Fig. 1 is an enlarged plan view of the fabric; Fig. 2, a cross section on the line 2—2 of Fig. 1; Fig. 3, a perspective view; and Fig. 4 is a diagram of the cloth. The fabric consists of regular or ground warp threads A, bias or diagonal warp threads, B B', arranged in sets, and weft threads, C.

The ground warp threads A run lengthwise of the fabric and the sets of bias or diagonal warp threads, B, B′, extend diagonally across the fabric in opposite directions, from one selvage, D, to the other selvage, D′, so that the bias warp threads, B and B′, cross each other between the adjacent picks and at the top of the ground warp threads, A, which pass over the weft threads, C, while the bias warp threads, B B′, pass under the weft threads, C, as shown in Figs. 1, 2 and 3. It will also be noticed that the bias warp

FIG. 2.



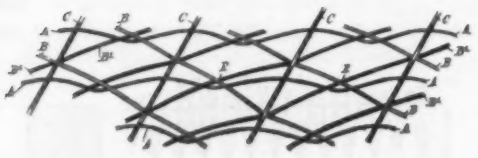


FIG. 3.

threads, B B′, cross each other under the weft threads, C, so that the ground warp and bias warp and the weft are compactly interwoven with each other to form a reinforced and exceedingly strong and durable fabric, capable of withstanding strains in any direction.

The bias warp threads, B, in passing from the selvage, D, diagonally across the fabric to the selvage, D′, extend over the other set of bias warp threads, B′, but the bias warp threads, B, when they extend diagonally across the fabric from the selvage, D′, to the selvage, D, pass under the bias warp threads, B′, running diagonally. By interweaving the warp threads, B B′, diagonally or zigzag across the fabric and in opposite directions to each other, it is evident that the fabric is reinforced in a diagonal direction to withstand strains in any direction, and at the same time producing an exceedingly close and compact weave. The set of bias warp threads, B or B′, extends diagonally from one selvage to the other for as many picks as there are bias warp threads used in the set.

COST OF A COTTON BLANKET IN GERMANY

BY G. GAUSS

Leipziger Monatschrift fuer Textil-Industrie

While the cost of material and manufacturing varies from time to time with the varying conditions of the market, the following calculations for a scarlet blanket such as is used largely in India, illustrate the method of estimating the cost of blankets. The figures approximate present market values. Assuming that the mixture yields 83.3 per cent. of No. 1 1/4 yarn and 2 1/2 per cent. of roving waste, we have the following cost:

1,667 lbs. Linters	.033	$55.01
833 lbs. Am. Sweepings ..	.033	27.50
1,333 lbs. India Sweepings..	.024	31.99
3,334 lbs. Fly	.022	73.35
1,167 lbs. Fly	.023	26,84
833 lbs. Shoddy	.025	20.82
833 lbs. Willow Waste ...	.027	22.49
10,000		$258.00
Spinning 8,330 lbs. No. 1 1/4 Yarn	.017	141.61
		$399.61
Less 250 lbs. waste	.033	8.25
Cost		$391.36

This is equal to a cost of .047 per pound for 1 1/4 yarn. The remainder of the calculation is, however, based on .052 per pound of yarn, the difference serving as a margin for the spinning department, which is operated more economically at certain times than at others.

The fabric is laid out as follows:

Warp 1,050 ends, No. 28 yarn, 30 cuts each, 71 yards long on the beam. This yarn is guaranteed to yield 807 yards for each yarn count and costs 24 cents per pound delivered at the weaving mill.

The warp is set 53 inches in the reed in order to give a finished width of 48 inches. The filling is woven with 13 picks of No. 1 1/4 yarn per inch. Each blanket is 48 inches wide and 79 inches long.

The cost of 109 yards of the fabric is as follows:

Warp, 5.3 pounds		$1.27
Filling, 78 pounds at .52		4.06
For listing		.16
Drawing-in		.01
The cost of weaving is based on a daily wage of 55 cents per loom and an efficiency of 60 per cent.		
Speed of loom 110 turns per minute	.72	
General expense	.72	
Napping	.24	
Dyeing 84 lbs. at 10 cents	.11	.92
Total 109 yards	.074	$8.10

The above calculations give the following result:

One blanket 79 inches at .074 per yd.	$ .16
Stitching on two sides	.005
Sundries	.02
Total	.185
Profit	.02
Total	$ .205

The blanket is sold to the exporter at 20 1/2 cents less 2 per cent.

A SPINNING DEVICE

The illustrations show a spinning device invented in France and recently patented in this country. Fig. 1 is a side elevation, with parts in section; Fig. 2 is a cross section; Fig. 3 is a cross section of a modified form of traveler; Fig. 4 is a perspective view of the guide ring, this ring being omitted in Fig. 2.

The traveler carrier is in the form of a rectangular frame, A, A, the lower member of which is provided with a central ring, m, and the upper member with a correspondingly-located bearing, b. The spindle passes loosely through the ring, m, and carries a fixed collar, h, between which parts is interposed a spring, q, designed to exert its pressure downward upon the ring. At its upper end the spindle is provided with a bearing, n, shaped for engagement with bearing, b. The rail, D, is formed with an opening, E, through which the carrier extends.

The traveler or thread guide, f, may be of many forms, one of which is shown in Fig. 2, and another in Fig. 3. In its first-mentioned form, it comprises an open wire frame of sufficient diameter to surround the bobbin when full. This frame is designed to travel upon the carrier, being provided for that purpose with small sleeves, r, slidable upon the carrier sides. Its vertical position

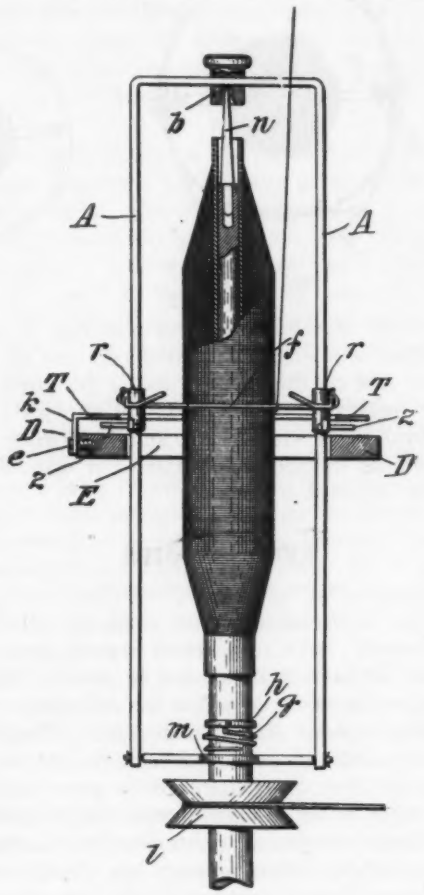


FIG. 1.

is controlled by arms or projections, z, connected to the sleeves and projecting between rail, D, and the guide ring, T, which they engage from beneath, the guide ring, T, being attached to the rail, D, by the screw, e, and being also provided with the lugs, k, which rest upon the rail. The spindle is driven in the usual manner through the medium of a pulley, l, or the like, and, in ro-

tating, has a tendency to rotate the carrier, owing to the frictional contact between the two. The traveler is thus capable not only of vertical motion, which is controlled by ring, D, but also of a rotary motion around the spindle.

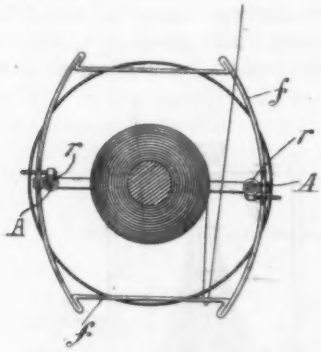


FIG. 2.

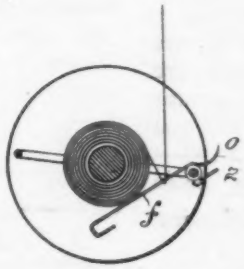


FIG. 3.

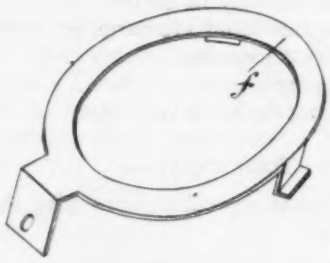


FIG 4.

In the modification shown in Fig. 3, the traveler is pivotally mounted adjacent to its outer end on the carrier, and is designed to bear against the bobbin, being provided at its said outer end with a small air-wing, c, or similar device, which assists in maintaining it in position.

ENGLISH NOTES

By Our Regular Correspondent

Bradford, Eng., Sept. 19, 1912.

Exports have quickened again and it would be hard to name any branch of spinning and weaving in which the mills are not making money. The splitting of the English industry into sections makes it readily possible for one department to be good while the other is bad, but all round the industry producers are faring about equally. Cotton spinners and cotton weavers are doing well and expecting to continue in the same way. Worsted spinners are not commanding wider margins, but are doing a very full trade. Makers of carded woolens of the lower and medium sorts are adding in a few cases to their premises. Hosiery men have placed large orders for yarns and in jute and linen employment is good and prices firm. The improvement cannot be traced to domestic conditions; it arises from the demand of the outer world. Expenses are rising for coal, leather and general supplies are going up and so are prices for dyeing and printing. Wages are rising in several departments and apart from the movement of raw materials the year end will see a general requirement of more money. Manufacturers are in general satisfied, but not so all the textile machinists. A large maker of cotton spinning machinery publicly deplores "the insane competition which cuts prices until they barely cover labor and material" and as publicly hints at prospects of a successful effort to raise quotations to a remunerative level.

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World conditions fix the degree of prosperity in English manufacturing and also determines the cost of the food eaten by operatives. Except on tea and sugar there is no tariff and the changes in the rate of taxation on these articles do not appreciably affect the broad result of a comparison worked out by the Cooperative Wholesale Society. For the purpose of illustrating the changes in the wholesale prices of grocery goods an average weekly family order of 21 1/2 lbs. weight is taken. The price of this parcel was in 1898 substantially $1.28, in 1910, $1.45 and in 1911, $1.42. Under virtually free conditions the price had advanced some 10 per cent. by 1908, 13.3 per cent. by 1910 and 11.2 per cent. by 1911, and in the same space of time coal advanced 33 per cent. at the pit-mouth The Society handles a great part of the food that is bought by mill workers and its records are of high value as experience.

Yorkshire worsted men are much interested in an installation of 54 automatic looms now working at Thongsbridge, Huddersfield. The available particulars are unofficial, but there is some authority for saying that nine weavers, three fixers and two bobbin girls operate the whole of them. This, in a town where wages are relatively high and where one weaver minds only one loom in the regular course, marks a revolution. The goods woven are clays and other plain white worsteds and the machines enable the owner to compete to good purpose with the cheap two-loom weaving done on ordinary looms in Bradford. Very favorable accounts of the experiments are current among manufacturers and it will not be surprising to hear of other purchases of Northrops. Attempts to introduce automatic looms in worsted weaving have been in progress for ten years. Manufacturers have tried their own hands at inventing automatics and machinists have produced types of automatic looms which find some market among makers of light worsted goods abroad. The achievement at J. T. Tinker's mill is, however, the first substantial success recorded in the English industry.

* * *

The special character of the calico printing trade may make the successful operation of a combine harder than in the case of producers of less fancy articles. Certainly the profits of the $40,000,000 Calico Printers' Association fluctuate, for they have been down to $200,000 and up to $2,000,000 within the last five years. The latest profit is rather better than one million and now something is to be done as the outcome of joint conferences between the combined and the uncombined printers. A federation is to be formed, partly to fix and maintain list prices for standard goods and prevent the inroads into profits that are made by customers' claims for allowances and partly to regulate questions of labor and wages. The federation is on the model of that of the master cotton spinners and votes will count in accordance with the number of machines operated. The power to advance rates of printing is limited by external competition and already a proportion of Lancashire goods go to the Continent to be printed. As done in this country, the business calls for the use of a great number of designs and the profit is very closely related to the maintenance of a full output. Year by year the C. P. A. shows a larger profit in the period January to June than in that from July to December. Its principal business lies in commission work done on cloth the property of exporters, but the Association has looms also and reserves certain of its designs for its own cloths alone.

* * *

Trade unionism is the British textile industry has made astonishing progress in the last decade. The 249,000 unionists of 1902 have become the 435,000 of 1911, thus increasing in number by 75 per cent. Rather more than four out of ten of the men, women and children employed are union members. In the cotton mills five out of seven of the whole force are unionists and in the finishing works about four persons out of five. The cotton mills are bunched closely together and the cotton operatives' unions have a long history. In the finishing trades the syndication of capital has facilitated the organization of labor as the large combines prefer to deal with their men as a mass rather than as units. The main body of unionists are to be found in these two departments which have between them substantially 90 per cent. of the whole. This is equivalent to saying that in the woolen, worsted, linen, jute and silk trades unionism is weak. Of these workpeople there are 25 outside the union for every 7 who are inside. The explanations of this fact offered are various. Many of the persons are young or female and thus notoriously difficult to combine. The phases of employment are generally more scattered, the work done is more miscellaneous in character than in cotton mills and in some instances the union leaders have proved less able than in the larger cotton industry. In these other branches such strength as the unions have is localized in certain places or among certain grades and in many quarters unionism practically does not exist.

Before labor unions were legalized in this country outrages on property were the common accompaniment of strikes. Warps were slashed with knives, machines broken and traps laid with intent to maim or kill non-union workers. Acts of physical violence still occur under excitement, but our strikes are conducted without dynamite and usually without many arrests. Arbitration rather than force is regarded on both hands as the natural end of these troubles and the large combines have sought to use the unions rather than destroy them. It may be thought, or said, that the combines sometimes get the better of the unions in a deal, but there have been instances to the contrary and in any case the avoidance of the privations of a strike is worth something. Small signs of trouble have shown themselves here among men working under a system which puts a premium on driving. The men get no premium bonus, but are on collective piece work, and in some instances this method of payment is quite sufficient to keep everyone busy and intent on doing his best. The superiors of these men have, however, a cash interest in improving the production endlessly and their not always tactful attempts to force the pace of men who are already driving themselves leads to exhibitions which necessitate some peace-making.

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Reports reach England of proposals to start new woolen mills in the south and north of China and they confirm the belief that many more woolen goods will be wanted in that country. The resolution of a year ago has done nothing to revive the dying trade in such specialties as camlets, long ells and Spanish stripes and it has materially disorganized the regular business in piece-dyed diagonal worsteds. The latter dyed in black, blue, brown, ash and stone shades are a standing order. Cheap fancy tweeds of medium weight and in bright colorings have come into more demand, but the fabrics taken in greatest quantity are cotton warp, heavy goods costing 25 to 37 cents, in blues and mixtures. Cloaks and two-piece semi-European suits are made of these heavy mungo goods and probabilities favor a continuance of this class of demand. For practical purposes 75 cents is the maximum limit in the China market. Recent attempts to sell more expensive goods have not received encouragement. The South American republics are the last great field of expansion and the Chinese republic is looked to as the next.

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Manufacturers lend a more or less sympathetic ear to the complaints of retailers in the textile towns. Two or three years ago the complaints were about the sale of lengths of cloth to employes and the consequent loss of profit to retailers. Latterly the protests have been against competition in other articles. Mail order firms get hold of somebody in the mill and make him their agent among his fellow workers for the sale of Christmas cards, watches, pianos and such luxuries. The retailers thereupon paint horrid pictures of the coercion of workpeople by their superiors into buying articles that they really do not want. So far as it has been carried, investigation lends very little color to this particular charge, but the question of buying and selling during mill hours and on mill premises raises points concerning organization. Employers are generally favorable to putting this trading down. They do not, however, universally recognize it as their business to preserve retailing as the sacred monopoly of the shopkeepers.

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Those who buy English hogg wool have already felt the effects of the 1911 dry summer with its consequent slaughter of lambs and shortening of this year's clip. It will be superfluous to look for a larger clip next year. The 1912 wet summer has been very unfavorable to the health of sheep and in many parts of the country the animals are in a low condition. Carcase prices are good enough to make farmers eager to save as many sheep as they can, but wet means disease where the flocks are concerned and an unduly heavy rate of mortality. All classes of farm produce are to be high in price this winter, and next June will probably find farmers with less wool on hand and exalted ideas of wool values.

Questions and Answers

Under this head we undertake to answer, free of charge, to the best of our ability, questions pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD RECORD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

If the question is not of general interest to textile readers and involves expensive investigation, a charge covering the cost may be made, of which the inquirer will be advised before any expense is incurred.

PEROXIDE BLEACHING

Editor Textile World Record:

I have had a number of years' experience in peroxide bleaching and there are a few questions which I would like to have answered by some of your readers who are also users of peroxide:

1. Why is so much oxygen necessary to produce a good bleach when the coloring matter to be discharged is so very small?
2. Understanding as I do that it is the nascent oxygen that does the actual bleaching, why is not the result instantaneous? Why so much time necessary on the different classes of goods?
3. Why is so much heat used in cotton bleaching?

Bleacher (2053).

The results of peroxide bleaching are dependent upon certain chemical reactions between the nascent oxygen on the one hand, and the natural coloring matter to be removed, on the other, and like all chemical reactions, is dependent upon three important conditions, time, temperature and concentration.

Time is necessary, other conditions being equal, on account of the apparently slow action of the oxygen on the coloring matter to be destroyed. While a large quantity of peroxide (we presume this correspondent alludes to peroxide of sodium) may be necessary in certain cases, due credit must be given to the improved condition of the goods bleached by it. The writer uses for mixed goods, consisting of either wool and silk, or cotton and silk, the following proportions:

For 100 pounds of material: The bath of 600 gallons water is charged with 20.7 to 24 pounds of oil of vitriol, added gradually and with stirring, after which sift in and with stirring from 15 to 17 1/2 pounds of sodium peroxide, and neutralize with a sufficient quantity of silicate of soda. The goods are then immersed and worked easily, while the temperature is gradually increased to 160° F. within 20 minutes, then continue to raise it slowly until it reaches 200°, allowing the goods to remain immersed until bleached a sufficient white, which depends upon the nature of the goods. Rinse and finish in the usual manner.

The reason why different classes of goods require varying lengths of time in the bleach bath is because the natural coloring matters are different, some resisting the action of the oxygen more effectively than others. This in a measure answers the question regarding the great amount of heat necessary for cotton bleaching, the reaction only taking place within a practical time by the aid of heat.

While the chemistry of bleaching is pretty well known and many processes are in use applicable to cotton, wool and silk, yet it is a fact that the chemical nature of many of the natural coloring matters found on the textile fibers are but little understood and less known, and without this information bleachers must be content to grope their way to commercial results.

Beta-Naphthol.

If one pound of sodium peroxide is neutralized with an acid, and then make the resulting hydrogen peroxide alkaline, not more than about 3 1/4 ounces of nascent oxygen is liberated. This oxygen will attack the natural coloring matter on the fiber until it is all oxidized. A part of the oxygen will escape into the air before it has had a chance to act on the coloring matter.

The bleaching cannot take place instantly, because the oxygen is given off gradually, depending on the alkalinity and the temperature of the bath. If all the oxygen were liberated at once, only a small part of it would remain suspended in the water. Most of it would escape into the air. Often some grades of goods are bleached more quickly than others. This is sometimes due to a dif-

ferent twist in the yarn. A soft spun yarn bleaches faster than a hard spun yarn. This difference may also be caused when the natural coloring matter of the different classes of goods are of a slightly different chemical composition. Heat is necessary in the bleaching bath to decompose the peroxide. The nascent oxygen is also much more active at a higher than at a lower temperature, and cotton can stand a higher temperature without danger of tendering. Granicus.

MACHINE FOR COUNTING BOBBINS

Editor Textile World Record:

Can you tell me whether there is a machine for automatically counting shuttle bobbins? In mills where many thousand bobbins are counted daily such a machine would be very useful.

Franklin (2073).

We do not know of any automatic machine for counting bobbins and doubt whether such a device has ever been made. A good method of determining the number of bobbins is to weigh the lot and then calculate the number from the weight per thousand, the latter being readily found by counting and weighing that number. We think this method would answer every requirement and that the slight error to which it might be subject would be negligible.

BLEACHING WITH PEROXIDE

Editor Textile World Record:

Referring to the answer of "Beta-Naphthol" to an inquiry on the bleaching of outing flannel in your July issue, we note that he recommends sulphur and especially bisulphide of soda for the bleaching of woolens, only bringing in the peroxides as an afterthought in the last sentence. We wish to correct the impression that peroxide bleaching is of secondary importance and has not been largely adopted by the wool bleaching trade. We are probably safe in saying that the majority of the woolens used for knitting and weaving purposes in this country are now peroxide bleached. The reason is obvious. The public has become dissatisfied with the very ugly color developed by exposure of sulphur-bleached garments to the air, due to the re-oxidation in part of the coloring matters originally contained in the goods. Again the highly objectionable odor, resulting from the retained sulphurous acid in such goods, makes the wearing of them, especially near the skin, most unpleasant, the moisture from the body setting the gas free and making it strongly noticeable.

With the continual reduction in the price of the peroxides, which has been going on in past years, due to enlarged output of the factories, the difference in cost heretofore existing between sulphur and peroxide bleaching has been effaced, and the last objection to the adoption of the all round more satisfactory bleaching treatment with peroxide has been eliminated.

The Roessler & Hasslacher Chemical Co.

CLEANING REEDS

Editor Textile World Record:

Our work is all men's wear worsteds, sized yarn, the reeds varying from 13s to 20s, 4 to 6 ends per dent. These reeds become very dirty from yarn flyings, size, grease, etc. Can you give us a method by which we can remove same, as this combination cakes on the reed while weaving, making it very difficult for the warp to come through.

Stevens (2071).

"Stevens" is no doubt making the size too strong, putting too much glue into it, or not boiling it long enough so that it will mix well. The reeding has nothing to do with the trouble. It may be that the size is left in the pans on the dressing frame and allowed to become cold. If this is the case the size becomes too thick and will go onto the yarn in lumps and when weaving will chafe from the yarn and clog the reed, causing the warp to run badly. The following formula is one of the best for sizing:

Water	lbs.	100
Starch	ozs.	8
Glue	ozs.	8
Softening oil	ozs.	4
Glycerine	ozs.	4

Care must be taken in the boiling and that the right ingredients are used. Be sure to see that the size in the pan on the dressing frame is not allowed to cool. Have a steam pipe connected with the pan and the steam turned on all the time. Do not allow any of the sizing to stay in the pan over night.

Run it off into a pail and turn back in the kettle used for the mixing. If oil cannot be had then double the amount of glycerine and boil until the mixture thickens and is suitable to go on without lumping. Above all do not allow the body of the size to settle to the bottom of the pan, but stir the mixture once or twice an hour.

Greenwich.

MANUFACTURING LUMBERMEN'S SOCKS

Editor Textile World Record:

We are sending under separate cover a sample of lumbermen's sock and would ask you to advise us what machines are necessary to make these goods and where they can be obtained.

Knitter (2075).

After examining the sample of lumberman's sock I am under the impression that it is made on the "Universal" knitter. I cannot say just what weight yarn it is made

OUTSIDE AND INSIDE VIEW OF LUMBERMAN'S SOCK

from. The "Universal" machine will also make cross stripes as well as the longitudinal stripes as shown in the sample. The rib top was made on an ordinary ribber and sewed on sock with trimmer attached sewing machine or seamer. The machine on which the sock was made contains 72 needles as also does the rib top. Owing to the structure of the machine it is necessary to sew the rib top to the sock, as the machine I am familiar with is not equipped for transferring with quill ring and the cylinder is not easily removed for topping. I am also under the impression that the Harley-Kay Machine Co., Georgetown, Ont., also make a machine for that class of work. This machine operates with two yarn carriers and two sets of cams. In knitting the sock under discussion every third needle had a long butt and the white stripe or pattern yarn was carried loose at the back of the short butt needles, forming the backing and making a heavier sock than could be made on the ordinary 72-needle machine in straight knitting.

Cipango.

PRODUCTION OF A LOOM

Editor Textile World Record:

Will you kindly give me the following information: In the manufacture of 36 inch 5 yard sheeting with 44 picks to the inch of warp and 44 picks to the inch of filling, how many pounds of both will be consumed in a square yard of goods? Also how many yards should a plain loom produce in a day of ten hours, running at 180 picks per minute? Would it be practicable on this class of goods to speed it up to 200 picks a minute?

Wellfleet (2072).

As the cloth is 36 inches wide, each running yard is equal to a square yard. There being 5 yards to the pound it follows that each yard will weigh 3.2 ounces. As the cloth is 44 square, the weight of the warp will be equal to that of the filling, consequently each square yard of the cloth will consist of 1.6 ounces warp and 1.6 ounces filling.

The production of this cloth per loom would depend upon the amount of time lost by reason of the loom being idle. This loss depends upon a number of varying factors. The theoretical production of a loom is found by dividing the picks per minute by the picks per inch. This gives the number of hundred yards per week of 60 hours. For example, on the cloth under consideration, the theoretical production would be $180 \div 44 = 409$ yards. If there was a loss of 10 per cent. the actual production would be 368 yards per week of 60 hours. Whether it would be practicable to speed the plain loom to 200 picks per minute is a question that could be decided finally only by a test. It is frequently found that increasing the speed of a loom results in a loss of production.

COATING COTTON DUCK

Editor Textile World Record:

I would like to know the builders of machinery for coating ducks; coating put on in the same way as oiled duck concerns do it.

Merritt (2067).

Our English correspondent replies as follows:

In England the manufacture of oilskins is carried on principally at the ports and in some cases the cloth is dressed by hand, the only machines used being for sewing the garments. According to the description of an eye-witness, there is a machine in use resembling in its main details the hot-air tentering machine. The fabric is held by the lists and carried forward at width in such manner that it dips twice into the oil that is used to impregnate and waterproof it. The cloth is carried forward continuously over hot pads, heated by steam, and at the end of its traverse has lost much of its stickiness. Drying is continued by festooning the cloth over laths where it remains for the oil to dry thoroughly by oxidation in contact with air. Other machines embodying the creeper and steam-chest features have been proposed by patentees. The one patented by Mann of Paris contemplates the giving of successive coats and the quick drying of each upon an endless lattice.

Obviously quick drying depends on the oiling composition used. Old receipt books tell of the means taken by fishermen to waterproof their own garments by spreading them on a table, scrubbing into them a mixture of paint and soap which took a full month to dry. The paint brush had to be rubbed on fresh cut brown soap so as take up as much soap as possible, with the apparent object of rendering the finished article more supple. Linseed oil, usually boiled and mixed with litharge or gold size to hasten drying is the agent that has been mentioned most frequently and that promises the best results. The boiled oil is thickened in some cases by dissolving in it resin or lac or by making a mixture with pipe clay, talc, whiting, ochre or chrome yellow. A patent taken out in 1896 was for mixing boiled oil with blood, cooking the mixture, adding color and vaseline and spreading the whole with a brush or knife. Another in 1891 was for soaking the cotton fabric in a decoction of cutch, rinsing in soft, cold water containing alum and common salt, drying and applying boiled oil with a brush or the like. The cutch might have useful coloring and preservative properties. A compound of boiled oil, gum tragasol, lime water, coloring matter and petroleum spirit is a recipe of ten years ago. Again there is one for giving three coats of a mixture of boiled linseed oil, castor oil, turpentine, driers, sulphur and yellow ochre. These have a more rational basis than Hull's receipt for mixing together gunpowder, blacklead and lampblack in about equal proportions and adding thereto beer and boiled oil; a mixture of boiled oil and yellow chrome being named as an alternative.

An inland England cotton duck is prepared with oil by small makers of cart and stack covers who have mixtures of their own to which the recipes given above afford some clues. An oilskin made by one of these is now coming into use in the dye houses. Dyeing vessels are being fitted with oiled canvas hoods in place of wooden ones, the canvas being stretched over a light frame. In addition to being oiled the fabric is strongly enamelled or varnished on one face to resist moisture and chemicals. The yellow fabric has the merit of passing a fair amount of light, thus enabling the work to be seen better. The actual operation of dressing the fabric is outside the range of the regular textile industry, but this product of the business is coming into the normal textile scope. Wessex.

Our French correspondent, to whom the above question was referred, replies as follows:

The ordinary process of coating duck involves the filling up of all the pores of the fabric so as to form a complete protection against the rain or other contact with water. Such fabrics cannot, of course, be recommended from the hygienic point of view. The earliest method consists in coating the duck with two or more layers of tar. This mehod, which has the advantage of increasing the solidity of the fiber and preventing

its decay, is not suitable for general use. The most widely used process consists of coating the fabric with an insoluble compound of copper, iron, zinc and aluminum. The copper compound usually employed imparts to the fabric a characteristic green shade. The drying oils, linseed oil in particular, are but little used except for the clothing of sailors. These fabrics, generally of cotton, are heavy, inflexible and of a color and appearance that make them unsuitable for other uses. The formulas for the compounds vary widely, as it shown by the recipes which follow.

The linseed oil is boiled gently for four or five hours. The ingredients which are used, such as litharge, acetate of lead, resin, etc., are first placed in a small bag. Great care must be taken in boiling the mixture because of the inflammability of the oil. The amber is dissolved separately in the open air because this operation is very dangerous. When the material is melted turpentine is added very carefully. All the ingredients are then mixed thoroughly.

Recipe No. 1

Linseed oil	lb.	4.50
Silver litharge	lb.	.25
Acetate of lead	lb.	.25
Mastic resin	lb.	.25
Venetian turpentine	lb.	.25
Onions	lb.	.25

Recipe No. 2

Linseed oil	lb.	5
Oxide of lead	lb.	1
Carbonte of lead	lb.	.2
Acetate of lead	lb.	.1

Recipe No. 3

Linseed oil	lb.	7
Acetate of lead	lb.	1
Silver litharge	lb.	1
Umber	lb.	0.125
Yellow amber	lb.	4
Turpentine	lb.	1

Recipe No. 4

Linseed oil	lb.	7.5
Litharge	lb.	.75
Umber	lb.	.1
Acetate of lead	lb.	.4
Yellow amber	lb.	.9
Turpentine	lb.	.75

Recipe No. 5

Linseed oil	lb.	7.5
Litharge	lb.	.75
Umber	lb.	.25
Acetate of lead	lb.	.35
Yellow amber	lb.	.6
Turpentine	lb.	.15
Sulphate of copper	lb.	.004

Recipe No. 6

Linseed oil	lb.	6
Yellow wax	lb.	2
Litharge	lb.	.6

Recipe No. 7

Linseed oil	lb.	10
Litharge	lb.	1
Yellow soap	lb.	2.5

Recipe No. 8

Linseed oil	lb.	10
Litharge	lb.	1
Resin	lb.	10

Two coats of the mixture thus obtained are applied hot with a stiff brush. The mixture is applied to the cloth after it is made into garments because it would be difficult to manufacture the clothing after the cloth had been previously coated. The garments after having been coated are hung in an oven and left to dry for several hours. After drying a light coat of tallow is applied to the garment with a soft brush.

Robert Dantzer.

BLEACHING LINTERS

Editor Textile World Record:

We would like to get some information relative to the bleaching of raw cotton, particularly the lower grades, such as linters, etc. We would like to get the best formula for this work, chemicals used, the time consumed in each process and the latest machines used. Mulberry (2074).

Some bleachers still hang on to the old method of bleaching linters and have no use for the new devices and methods. The caustic bleach is generally used. The ingredients are as follows: Use a 1 to 2 per cent. solution of caustic to the weight of raw stock in the bleach, according to the quality

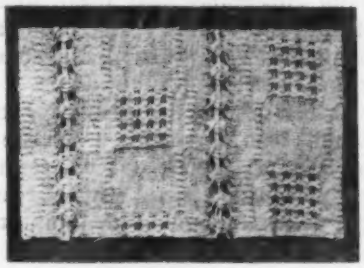
of the stock. For 100 pounds of stock one to two pounds of caustic should be used. Boil for five hours and if the goods are not white enough flush the kier or machine with clean water, mixing a solution of one to one and one-half per cent. of soda ash. Fill up the kier again and boil for another two or three hours. This may seem a long time, but time is essential. If the stock is bottomed in the boil time will be saved in the chemic bath, less drugs will be used and the rink of tendering the stock reduced to a minimum. After the stock is boiled the required length of time, wash well before immersing in the chemic bath or bleaching agent, which should not be stronger than 3/4° to 1° Tw. The stock should lie in this bath until all the seeds and ticks have disappeared. This will take anywhere from three to five hours, according to the quality of the stock. After the stock is white enough it should be taken from the chemic bath, thoroughly washed and then treated to a sour or acid bath at a strength of 1° Tw. Let the stock lie in this solution for one to two hours, or long enough to neutralize the action of the chemic or chlorine. The stock is then ready for the last wash, which should be thorough so that no trace of the acid will be left. Otherwise the fiber will become tender as soon as it reaches the dryer. This rule applies to almost all kinds of cotton stock, yarn or piece goods. Of course one must use discretion, regulating the treatment by the condition of the stock. Delco.

LENO WEAVING

Editor Textile World Record:

Kindly explain how the accompanying sample is woven. Where the two heavy picks come there is an 8 by 8 leno, and where the squares of leno

A loom to produce cross stitch effect has rods for each separate crossing, and additional lift had to be given to the easing rods when the extra crossing pick is made. The reed is set back from the usual position to allow a number of hooks to be operated in front for carrying over or making a cross over on a fairly large number of threads as in sample shown. The hooks are suspended from bars according to the pattern and moved from right to left and up and down. The ends to be crossed over are raised, the particular hooks moved forward and at the same time the ends are gathered into the hook. When moved the proper distance the hooks descend, carrying the crossing threads down. At the same time the ends over which the others have been crossed are raised. This forms a shed and it is necessary to use a heavier count of filling for that pick because of the strain caused by the



A LENO WEAVE PATTERN

cross. Both sets of threads require to be eased or slackened. Moving back the reed from the usual position necessitates the use of guide pins to guide the shuttle across the lay. These pins pass up through the lay, occupying practically the regular position of the reed. The guide pins rise as the lay moves back and descends as the lay moves forward to allow the reed to beat up the filling.

Another method is to use double doups or a regular leno doup within a doup. To understand the need of additional apparatus to the regular requirements for leno cloth making, a careful examination of the cloth should be made. This will disclose the fact that a plain cloth is made both before and after the crossing takes place. This is impossible with a reed that has dents missing from one-quarter inch which is about the width of the crossing. There must be some means of beating up the filling. The finer the cloth and filling used the greater the necessity for a complete reed. This being the case, if the mechanism first mentioned or a similar apparatus is not used, other arrangements must be made for making the crossing pick, so that an extra doup may be used in front of the reed. Jean Paul.

Knitting Department

THE KNIT GOODS SITUATION

The month of September has not been quite cold enough to stimulate very heavy buying at retail, but it has been a very busy month for makers and distributors of all classes of knit underwear. Desirable lines are very difficult to obtain and many that looked like poor value during the initial buying season are now eagerly sought after and all sorts of reasons are given the manufacturers to induce them to take care of the buyers who gave them little consideration early in the year.

Possibly the most difficult lines to obtain are the plain stitch combination suits for women to retail at 50 cents and the men's combination suits to retail at $1.00. Some lines of the former that were offered early as low as $3.62 1/2 are now being held firmly at $3.87 1/2, and men's suits that were priced in January at $6.75 are now held at $7.25; these quotations only for late delivery.

The principal reason given by manufacturers for being behind with their orders is that it is extremely difficult to get the labor. Cotton and yarns are fairly easy, but in a number of mills at which the writer called, he found the finishing rooms piled high with goods. The manufacturers are unable to get an organization together to finish them. The character of the help throughout the Mohawk Valley is rapidly changing and the places of the American girls are being taken by the foreign element to a large extent.

The few manufacturers who are making the plain stitch suits for women to retail at 50 cents are fairly swamped with orders and many which should have been shipped in July are still unfilled.

The lines of men's fleeced goods are practically sold up for the season or, at least, until as late as November 20th to December 1st on all standard lines. This, of course, is too late for jobbers to take in any volume of merchandise.

Some duplicates have been placed on standard fleeces during the last month, but advances as high as 37 1/2 cents per dozen have been paid for November 1st delivery. Men's 11 and 12 pound cotton ribbed shirts and drawers have been put up from $3.25 to $3.50 and from $3.37 1/2 to $3.62 1/2 and even as high as $3.75. Perhaps the latter price was only made to scare off the buyer, as the manufacturer stated he had about all the business he cared for this season.

There has been no change in prices of wool lines, although an advance is justifiable in view of the shortage of wool and consequent high prices of wool yarns. There is, however, the possibility of the buyer being made to pay an advance by the manipulation of the stock.

Jobber's travelers who have been out for the last month soliciting spring orders report quite generally a satisfactory business. They state there is not the tendency to hold off that might be expected in a presidential year, but that buyers are placing their orders quite freely and one noticeable fact is that they are buying higher priced goods generally.

Orders are being placed more freely than ever for combination suits and one of the changes noticed in the children's lines is that several makes are being shown with closed crotch and buttoned flap to take the place of drop seats. In ladies' goods a large amount of business is being placed on suits made of plain stitch cloth without being shaped at the sides and so made as to be full width through the hips.

Tuck stitches in all classes of underwear are going slowly, the trade demanding the plain stitch fabrics on account of their smoother appearance.

The B. V. D. manufacturers have issued a circular letter, stating that in future they will place an additional button on all their lines of men's suits between the center of the crotch and the point in front where the two sides are joined. This will hold together the two flaps without causing the discomfort ex-

perienced when a closed crotch made of non-elastic material is worn.

SWEATERS

A heavy demand for coat sweaters has been apparent for the past two months, and just now it is almost impossible to get deliveries on any lines. On many lines deliveries are not promised before November 20th to December 1st and in some few instances makers have advised the trade that they can take no more orders this year. A very noticeable feature of the demand is that it is so largely for red, either cardinal or maroon. Greys are not as much called for as last year, and there are indications that navy blues are increasing in popularity and will soon be in good demand.

As for the styles that are being taken, the plain shaker knit garment with large Byron collar seems to have the call for men, women and children, and it is an easy matter for retailers to get from $5.00 to $8.00 a piece for large quantities of this style garment, especially in the maroon color. The ruff neck coat is also in great demand and possibly as the colder weather comes on, it will take the lead over the Byron collar.

Calls for knitted blazers have fallen off since July, but there promises to be a revival for this style garment for spring wear and the various manufacturers are showing very attractive lines for March and April delivery. Norfolk coats have sold well in cardinal, white and tan. These are being taken mostly in plain stitch fabric with small Byron collar.

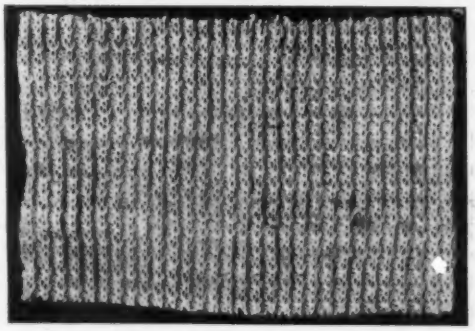
Among the newer novelties are the Scotch Mackinaw coats with fringe borders to retail at $10.00 to $20.00 each. Angora coats are also being shown in the more exclusive shops in plain white, brown and heather mixtures and are being sold quite freely at from $6.00 to $10.00. These garments with cap and mittens to match make very attractive outfits for automobile wear.

The Zimmerman Co. of Jersey City are doing a very heavy business on rope stitch coat which, as its name implies, is made of very coarse number of yarn, but of high grade stock. These are being taken principally with ruff neck collar and are retailed at from $8.00 to $10.00 each.

BASKET STITCH KNIT GOODS

BY DENBIGH

After cleaning the cylinder and dial thoroughly and setting the work up, take out every other needle in the dial, then block out every other two feeds on the dial cap so that the dial needle will tuck on the two feeds blocked out and cast off on the next two feeds. If there are eight feeds on the dial or



A BASKET STITCH

machine, there will be four feeds tucking and four casting off. On the feeds that are tucking it is a good plan to let the dial cam out so that it does nothing more than keep the stitch from looping out of the hook on the needle and at the same time avoids putting an extra strain on the stitch. The cylinder stitch should be drawn about one-half turn of the screw longer than it is on the cylinder cams which are opposite the dial cams. This eases the strain on the stitch and helps to prevent holes, which are usually the greatest difficulty in making this class of goods. After adjusting the machine the take-up is carefully adjusted so that it will be tight enough to keep the stitch clear. When coming off the needles have the stitch set so that it will knit about thirty-one stitches to the inch on 2/50s lisle on 11 cut cylinders. These goods are usually made of bleached cotton and lisle yarns. It is difficult to knit a perfect basket stitch unless the machine is carefully adjusted. It will help the work a

lot if small sleeves are soaked in white oil and slipped over the yarn guides on the stop motion. These guards keep the yarn from jumping out of the forks. Set them so that the yarn when passing into the fork will just rub against the sleeve. The yarn will not take up enough oil to discolor the cloth, but just enough to make it more pliable. If these instructions are carefully followed there should be no trouble in making a basket stitch. In a large mill where I was once employed they could do nothing with this kind of cloth, although the trade called for it. One day the superintendent asked me if I had ever made basket stitch. When I told him I had he asked me to make a lot of samples which I did with the result that today this mill is making a large quantity of this fabric which is one of the best sellers.

MILL EXPERIENCES

Under this head we will publish from time to time stories from practical mill men, telling of vexatious and unusual difficulties which have occurred in different branches of mill work, and how they have overcome them. We invite mill men to send us an account of such experiences. We pay, of course, for all that we use. Facts told just as you would tell the story to a friend are what we want, not fancy writing.

SOME EARLY KNITTING MEMORIES

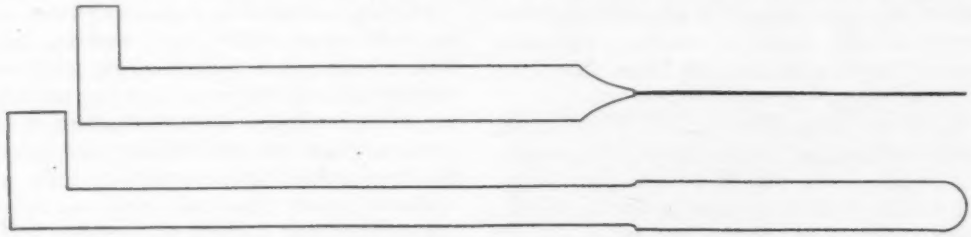
BY CYMBAL

I worked in one of the largest mills in the country as a boy. There were perhaps 175 or 200 spring needle frames; about 25 Tiffany rib machines in one part of the mill, and in another part there were about 40 or 50 Payne winders and about 50 of the old Joseph Higgenbothom knitting frames. These were latch needle frames with brass dial and cylinder, a low bobbin rack and the short legs were not over three feet high. These would not come within four feet of the top of the regular Scott and Williams frame of today. They had a roll take-up, and a mirror was set in the frame of the take-up roller so a knitter could see the back of the cloth from the front of the machine. There was also a separate set of levers for each set of cams. These levers were worked from a jack that set in a chain of high and low links, and were always out of order. The chains caused more trouble than any other thing in the room. Next in the trouble line were the brass cylinders and dials. There were no sections or gates in the cylinder, just a solid cam ring, and in case of a jam or smash, the only way was to take the frame down and pound out the cylinder from the ring with a block of wood and a hammer.

The boss knitter was a good workman who knew the frames. I had been running six of these frames and a back breaking job it was, leaning over all day and keeping an eagle eye on the bobbins. To let a bobbin run off meant a press off, or quarter off as it is called when the cloth runs off the needle, and in almost every case this causes a smash. The needles had a habit of dropping in between the cams when the cloth was off, as it was supposed to be next to impossible to grind the cams to have them come close together. We were using a heavy needle and it did not take long to wear low spots in the soft steel the cams were made of. No one knew any too much about latch needle knitting at that time and great improvements were on the way. I ran these sets of frames for about two years when the second hand or fixer quit to take a job in a new mill. I was asked to take his place. I was not over eighteen years old and being handy with tools had helped considerably in fixing up dials and cylinders. The set of frames I ran was close to the bench. I had often done jobs or watched them done and had an idea I could fill the position. If I live to be a thousand years old I shall never forget the feeling I had when I obtained this my first job as a fixer.

It was on a Monday morning that I stood near my old set of frames explaining to the new knitter what yarn to use and giving him pointers, when a girl knitter came up with a smile and said her frame had stuck. I went over and looked at it, but there was nothing to see, the difficulty being out of sight. We had a habit of trying to jar a frame loose in a case like that. A bad habit as I learned later. We would get both hands on the hand wheel, jerk it back as far as it would go, then

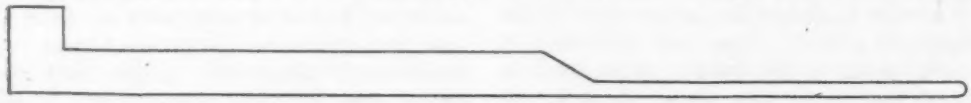
give it a quick jerk ahead. Sometimes this worked and sometimes it made a bad smash worse. It was my first job and to show what I could do I decided to take it apart. The boss came around just then and advised me to take it down and then went away. I felt big, for I knew all hands were looking. I had filled my pockets with wrenches and screw-drivers that morning and was prepared to do most anything. I took the yarn from the rack and lifted the small rack from the frame alone. I then attempted to lift out the cap and dial. Such a laugh as I got. I had not taken the nuts from the cross arms and I of course lifted on the whole frame by that means. I had not even run the cloth from the needles, I was so excited. The boss came over and helped me and we got the cylinder out by taking out the cam ring and all. I sat on the floor and with a two-pound hammer and a block of wood managed to separate the cylinder and ring. Every time I hit that block of wood I said something, as the laugh I had got did not improve my temper.



TWO VIEWS OF A CYLINDER SPREADER, FLAT AND NARROW

When the two parts were separated all the cylinder needles lay on the floor and I picked them up and carried the cylinder and ring to the bench. The smash was not a bad one, not over four or five needles or butts turned over and jammed between cylinder and ring. The slots had been filled so much a needle would wobble all around. It was supposed to be a 24 gauge, but there would not have been any trouble in putting in a 12 or 18 gauge in most of the slots. It took me a long time to learn that this was the result of a slot file. I have always found that it is best to use a spreader, that is, a piece of soft steel, flat on one end, to drive into the slots, and hit the spreader so as to bring the wall straight again. I generally have this spreader made about nine or ten inches long, ground down on the flat end to fit the slot very tight. The end used for the hammer is turned over about half an inch so it can be driven out as well as in if using in close quarters. Many times on fine gauges the butt of a needle will answer the same purpose.

I fixed the slots in the cylinder, using a spreader and file as usual. I told the boss my idea regarding the slot file, but he only answered, "When the cylinders wear out we will get new ones," but he did not get them for some years. I put the frame together after I had put lots of oil all around, and when I put the cloth on the needle and attempted to work it down, the cloth tore away every time I attempted to turn the frame. I worked over that frame the rest of the day and part of the next. The boss came around, looked it over, gave me the laugh and went away. I later hit upon the difficulty by accident. I found there were no check screws on the cylinder stitch cams and the smash had raised the cam so the needle would not pull a stitch. I had put the cam back where I thought it would go and put the cloth on again. This time the cloth went down nicely.



A DIAL SPREADER USED ON FRAMES

We used a rod about a foot long, a 1/4 inch brass rod that marked off its length from the guide, to try the stitches to see if all pulled the same length. It was a long, tedious job, but I finally righted the difficulty.

How odd it seems to look back and think of getting the stitches even by a foot of brass wire. Now we do the same thing in about a minute, measuring off about three of four yards of yarn instead of a foot. I finally had the frame working all right when the boss came around to see it. He told me he knew at a glance what the trouble was, but wanted me to find it myself, as that was the only way to learn. The first few months were full of worry for me, and many a midnight found me close to one of those little frames. In addition to fixing frames, the second hand was supposed to keep the yarn going and look after the rolls when knit and watch the orders. We were using a jack spun yarn on some of the frames and sometimes the spinners and I had hot arguments over the quality of the yarn. Many times the dispute was three-sided, as we got the boss carder mixed up in it. I was willing to fight for what I thought was right, but the boss knitter only laughed at me and said it would do no good. Again the boss winder and I would have a turn over his failure to wind enough yarn for me.

We had good help and they certainly tried to do their duty, but the production seemed to stand still. I did not feel as if I could drag along and watch the clock all day as some others did; I had too much ambition. I knew the frames could do more work so I tried by many experiments to get more cloth. There was one frame in particular that had always brought trouble. It would smash or turn over cylinder butts about as fast as it could be fixed. I had the frame taken down, the needles taken out and the rings taken off. I thought the cause lay in a sharp corner of a cam or a space where the butts could drop between the cams. I could not see anything that would cause damage so I asked the boss to look it over, but he could find nothing, so I put it together again and started it going. It smashed again the same day, and I then took the cam ring out and went over the cams. They seemed to be a good fit and there were no sharp points or corners. The cam ring laid on the bench and every time I got a chance I went over and took a look at it. The dial cap and dial were also on the bench and I noticed the yarn guides were badly cut on the inside, where the needles run. While I was looking at the guide I noticed the yarn bracket was not like the others, but was a home-made affair and set low on the cap. Where the guide bracket came ut over the cylinder needles it was marked and cut and each time after smoothing it had a fresh scratch. I did not give it much thought just then, but a few hours later I was working on another frame and happened to think about the cuts on the cap on the bench. I saw at once that the trouble lay in the guide bracket, for it would not clear the cylinder needles when at their highest point. The result was that the cams pushed the needles up against the bracket just far enough to bind them. I put the frame together again, put in the needles and sure enough I was right, the home made bracket was too low. I bent the brackets up about one-quarter of an inch, also bending them forward enough to have the guide set straight. I started the frame after getting it ready and it ran quite smoothly. I never told the boss what I had done, he took everything as it came, never worried and did not seem to care as long as a few frames were running. He said he never expected to get them all going at once, but I had different expectations. The 13 inch frame was now running and this gave me encouragement to try another bad one.

(To be continued.)

PATTERNS FOR UNION SUITS

Editor Textile World Record:

Could you inform us where we can obtain patterns for men's union suits suitable for knitted fabrics from spring and latch needle? We have had several requests lately for union suits, which is out of our line, and would appreciate any information you can give us on this subject.

Gilbert (2057).

I do not know of anyone that supplies patterns for underwear. The best way would be to buy a garment and copy it. Lay it over a thin pine board or the thin cardboard used to press goods, mark around it, allowing for all

seams, trimming and finishing. Make up a garment from this pattern and change to suit. There is really no standard of sizes outside of government specifications. Half a dozen suits made by that many different mills marked all the same size will prove that the makers have their own ideas as to size. Not knowing what weight garment "Gilbert" desires to make I will not give the size of machine, but following is a ribbed suit size list:

Size	34	36	38	40	42	44
Chest	34	36	38	40	42	44
Trunk	29	31	33	37	39	41
Inseam	30	30	31	31	32	32
L. Sleeve	19	20	20	21	21	22
S. Sleeve	6	6	6	7	7	7

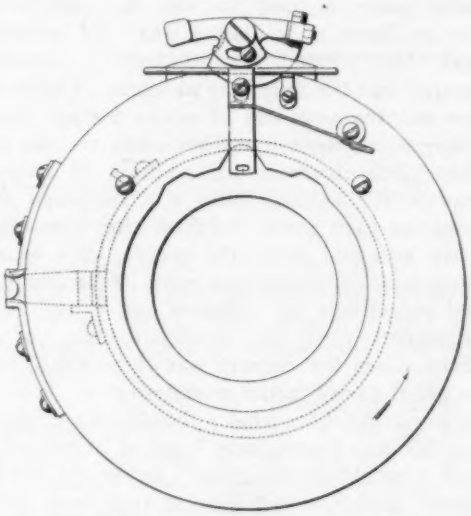
Cymbal.

AN IMPROVEMENT IN SPRING NEEDLE KNITTING MACHINES

The illustration shows an improved knitting machine recently patented in this country. Independently movable spring beard needles are used and means provided actuating the pressers. There is a thread feeding mechanism, combined to perform the operation of tubular knitting with capacity for the insertion of heel and toe pockets as usually practised in stocking knitters.

Machines of this type should be provided with means for sinking the loops between the needles in order to facilitate the formation of the series of loops which is to be interknit with the course last formed. It is also important in connection with all knitting machines employing independently movable needles, to provide web holders whereby the fabric is held down as the needles advance through the formed loops. In the new machine there is provided a series of movable sinkers alternating with the needles, but operating independently of them.

The loop sinking and web holding are effected by separate notches, with which each sinker is provided at appropriate levels. The entire series of sinkers is successively thrust forward and back and again forward to enable the upper notches at the time of the first projection, to operate as loop sinkers, and to enable the lower notches at the time of the second projection, to operate as web holders. Coincidently with these motions, and in correspondence with them, other parts of the mechanism are controlled to cause the yarn which is to form a new set of loops, and which has been properly sunk between the needles at the time of the first advancement of the sinkers, to be drawn down to a lower level when these sinkers are again retracted, so that the new loops are knit



A SPRING NEEDLE KNITTING MACHINE

into the already formed web, which is held down by the web holding notches at the time of the second advancement of the sinkers.

Fig. 1 is a plan of a circular spring needle machine showing the improvements. As the machine rotates in the direction of the arrow the thread is fed to the needles within the recess formed by the sinkers. This feeding occurs on the level of upper notches of the sinkers, and at the time when the needles are at their upper position, so that their beards are at a considerable distance above the thread. Further rotation of the machine produces projections of the sinkers occasioned by the action between their projections and the incline on the internal end of the cam. This causes the thread received within the notches to be forced under tension against the shanks of the needles be-

low their beards, sinking the loops to the desired extent, whereupon the needles begin to descend and receive the thread under their beards.

After the thread is well under the beards of the needles, the sinkers again recede under the action of the cam, which results in the disengagement of the notches on the sinkers from the thread to allow the thread to be passed to the lower notch. As the needles continue to descend to their stitch forming level, the thread is arrested by the ledges of the sinkers. At this point the sinkers are again projected by the incline of the cam to their normal course of travel, thereby engaging the thread with the lower notches and acting as web-holders for the remainder of the revolution of the machine. The beard pressers remain in their upper position until the needles have descended to the stitch forming level. This allows the old loops formed on the previous revolution of the machine to be cast over the top of the needles. The needles again ascend to their idle level and at the same time the pressers again drop to the inactive level.

A KNITTING KEY

BY WINWICK

Better methods of determining the proper sizes of yarn for obtaining a correct weight in knit goods are greatly needed. The method I employ is "a cut and try method," but it is based on a careful record of results obtained. It is a dual record of both stitches and weights. On our full fashioned product we list the stitches used on each kind of yarn in the following manner. The stars we have marked with a center punch near the rim; when this mark is at the spring retainer we list the set as star O. Nearly all our stars have 60 nicks in the rim and a quarter turn for finer stitch would be listed star 15, while a quarter turn for looser stitch would be star 15. Half a turn would be 30, three-fourths of a turn would be 45, and a turn 60, etc. The + or — sign to be used as per direction in which the star is revolved. For our coarsest merino or sole yarns we set the block down at the limit of the stroke and list it block O. This check block determines the position of the slacker on its down stroke for the knitting of the heel tips or toes With finer yarns we would set the block one notch higher and record it Bl 1. For the body yarns we set the stitch with the adjusting screw at the top of the slacker stroke and, counting the notches from the position of the block, we list the same as slacker 2, etc. Our complete record for a single style would read:

Style 728

Body	Splice	Tip
2/56 White Worsted	80 S. I. Black	2/42-60/40
Star 0	Block 1	Slacker 4

Weight 16 ozs.

Each notch of the slacker is equal to 15 nicks or a quarter turn of the stars on the stitch regulating shafts. A few minutes time is all that is required in which to calculate how to set the machine for any combination of yarns. We find this method a great saver of time because by its use we are able to make quick changes from one style to another. Our records of the past twelve years cover nearly every number of yarn which can be knit to advantage, and we find them invaluable in the plotting of new styles. Of course some one will want to know how we make allowance for wear without losing the zero position on the star. When we detect the slightest variation in the fabric we adjust the stitch pins under the presser arms, instead of turning the star as is more often done. This pin regulation will not have to be made oftener than once a year on the average. It was a surprise to us when we noted by our records how seldom we found it necessary to readjust the stitch for wear of the machines. We have used the same system on seamless knitting by calibrating the machines over the stitch levers and recording the lever positions. The lever positions can be maintained constant by making the readjustments for wear at other points in the machines.

The total consumption of cotton in the United States in 1911 was 4,704,978 bales, of which 4,258,750 bales were upland, 64,237 bales sea island, 175,430 bales foreign, and 206,561 bales linters. In the cotton growing states the consumption was 2,328,487 bales.

IMPROVING THE TEXTURE OF KNITTED FABRICS

An attachment to a knitting machine for improving the texture of the knitted fabric has recently been patented in this country and is shown in the accompanying illustrations. It is intended to produce a knit cloth of closer texture than would be made by a machine by the ordinary method. Fig. 1 is an elevation of a rib machine having a non-

FIG. 2.

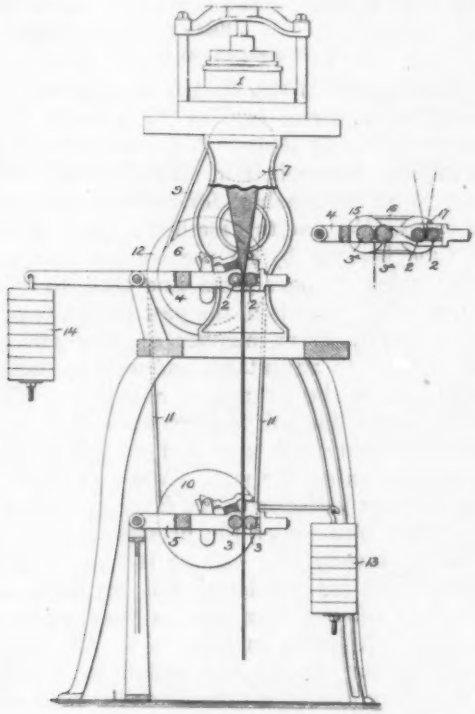


FIG 1.

rotating cylinder and dial, equipped with the attachment. Fig. 2 shows the improved take-up. Fig. 3 is a side elevation showing the attachment applied to a rib machine having a rotating needle carriage. The inventor in his description states that in the operation of an ordinary knitting machine it is not practicable to impart a heavy tension to the knitted web, the limit in this respect being determined by the amount of strain to which it is safe to subject the stitches upon the needles. If, however, the knitted web is subjected to a relatively heavy tension shortly after its production, or before its stitches have time to become set, as by differences of heat and moisture effecting, after a time has elapsed, a more or less permanent impressed bend or curve at each knit loop, a closer texture, or a closer disposition of the needle wales of the web, can be produced than would normally be possible with a given gage or degree of separation of the needles of the machine. This result cannot be accomplished by subjecting the web to heavy tension after its stitches have thus become set.

This invention consists in subjecting the freshly knitted ribbed web to such heavy

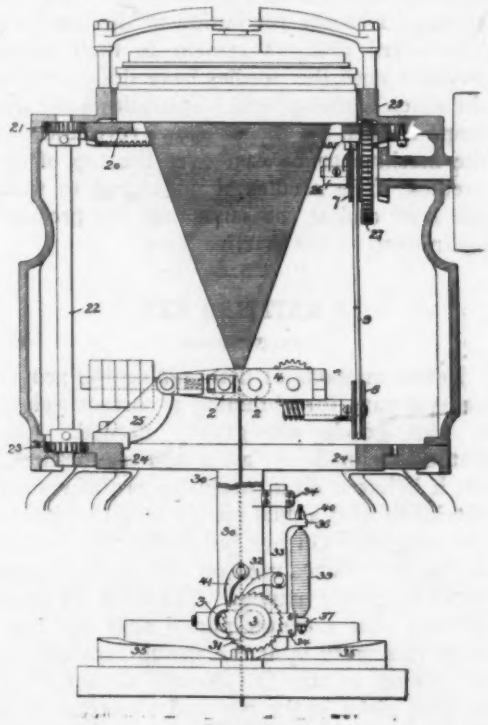


FIG. 3.

tension without imparting a like heavy tension to the stitches upon the needles. One means for accomplishing this result is shown in Fig. 1, which represents a rib knitting machine of any ordinary construction. It has a pair of take-up rolls for the knitted web, and a pair of supplementary take-up

rolls located below the first and acting upon the web as it passes down from said first pair.

The primary take-up rolls, 2—2, are carried by a swinging frame, 4, and the secondary take-up rolls, 3—3, by a swinging frame, 5. One of the primary take-up rolls is positively driven by gearing of such character that there can be no rotative movement of the roll by reason of downward pull upon the web passing between the rolls, and consequently no transmission of tension from the web below the rolls to that above the rolls, without movement of the frame carrying the rolls. The take-up roll is driven by bevel and worm gears from a shaft having a pulley for receiving a belt from a driving pulley on a shaft above the same. When the swinging frame carrying the take-up rolls descends, so as to tighten this belt, power will be transmitted to the driving take-up roll and the web will be taken up until the roll-carrying frame has been lifted sufficiently to slacken the tension on the belt, when the take-up will cease until the roll-carrier has again descended sufficiently to tighten the belt, whereupon the take-up will be resumed and these operations will be repeated indefinitely.

SPOTS ON KNIT GOODS

Editor Textile World Record:

I am enclosing a piece of knitted fabric. We are having considerable trouble with black specks which you will notice on the goods. Kindly tell us what is the cause of the difficulty.

Claxton (2076).

The spots on the sample of knit goods submitted have the appearance of iron spots, and I find that soap and water will take them out. This indicates that they are not caused by iron from the kier, otherwise soap and water would have no effect on them. They are evidently made by black oil or dirty water. It is difficult to say just what does cause them, as "Claxton" does not say where they are first noticed, whether after the goods are taken from the kier, or after being finished. I was in charge of a plant a few years ago when spots began to appear on the goods. Some were small and some large and in some places the spots appeared as if a black liquor had been put on with a fine spray. We watched batch after batch and could not locate the cause of the spots. We finally concentrated all of our attention on the extractor, and finally found the cause by accident. The man who did the oiling was using too much oil, which was squirting out and occasionally flying on the goods. I had the same trouble in another plant where I worked and we spent a lot of time looking for the cause. Finally it was discovered that a bearing under one of the washers had worn down and was a little loose. When the machine was running it would give a slight jump every little while and the dirty water and oil would squirt onto the goods. Soap and warm water with a little rubbing would remove the spots. Any of the above causes might apply in "Claxton's" case, or the spots may come from some overhead bearing. The kiers may not be whitewashed enough. Is a wash used to take the scale off the boiler? Is there a return system in the plant that carries the exhaust from the engines and machines back to the boiler, taking along with it all kinds of oil and grease that would pass through the strainers and get into the boilers to be returned with the live steam and deposited on the goods in the kier? The trouble can be caused in any of these ways. First of all, watch the kier, as no doubt the trouble is caused there.

Delco.

* * *

The trouble appears to be caused by oil dropping from the holes in the bed plate to the rollers or plate underneath, spattering or spreading on the rollers, and coming in contact with the cloth there. The spots might come from the gears if they have no high guard. These causes would arise on a machine where the cloth stands still. If the cloth goes around, the cause may be too much oil on the take-up rocker and cams, as it would spatter all the way around, there being nothing to protect the cloth beneath. Examine the hangers above the extractors. Wrap the hangers with rags to soak up the oil and keep the take-up rollers clean.

Trenton.

Dyeing, Bleaching, Finishing, Etc.

ABSORBENT COTTON

BY DR. LOUIS J. MATOS

By the term absorbent cotton is meant raw cotton, either bleached or unbleached, that has been deprived of all foreign matters, such as oil, waxes and mineral salts, and which thereby is given the property of rapidly absorbing great quantities of water. In a restricted sense the term is applied to that particular kind of cotton that is used by surgeons as an absorbent and dressing, and with which we are most familiar. This cotton is generally sold in sealed or unsealed packages of various sizes, some brands of which have been rendered aseptic by being sterilized.

There are other forms of cotton that are also absorbent, but not made use of by surgeons, but are employed very largely in the manufacture of so-called soluble cotton for the preparation of pyroxylene varnishes, artificial silk, collodium, etc. Absorbent cotton proper, such as is intended for surgical use must possess certain properties which are specifically prescribed in the United States Pharmacopoeia, as follows, under the head of "Purified Cotton":

> White, soft, fine filaments, appearing under the microscope as hollow, flattened and twisted bands, spirally striate, and slightly thickened at the edges; inodorous and tasteless; insoluble in ordinary solvents, but soluble in an ammoniacal solution of cupric oxide.
>
> When Purified Cotton, previously compressed in the hand, is thrown on the surface of cold water, it should readily absorb the latter and sink, and the water should not acquire an acid or an alkaline reaction (evidence of proper purification and absence of fatty matter).
>
> Purified Cotton should be perfectly free from all visible impurities, and on combustion should not leave more than 0.3 per cent. of ash.

Briefly the preparation of absorbent cotton consists in giving the stock a suitable alkaline boil, then bleaching and afterwards souring, these several operations, divided by very thorough washings which are necessary in view of the U. S. P. requirements. The finest grades of raw cotton are not entirely suited for this purpose; the sea island cotton, owing to its great length of fiber, is extremely difficult to render absorbent. Certain other grades have too woolly a character and owing to the nature of certain coloring matters found in some other kinds of cotton, they cannot well be bleached. The stock best suited appears to be the middling grades of Allen seed, New Orleans, Texas, Mobile, and benders. In selecting the stock care should be exercised that no seed hulls are present, for the reason that fibers with fragments of hulls attached cannot be properly acted upon by the chemicals. In this connection it should be noted that cotton can be bleached without taking on water absorbing properties; on the other hand it may be made absorbent without being bleached. The details of the chemical treatment for preparing absorbent cotton are as follows:

The cotton is loaded into a kier where it is thoroughly wetted out by circulating boiling water for several hours, which causes the removal of a considerable portion of soluble impurities and at the same time preparing the non-soluble impurities for the hydrolyzing action of a 1 per cent. solution of caustic soda, which is circulated for twelve hours under low pressure, thereby completely saponifying the fatty and waxy bodies present, together with pectose, a substance always found in raw cotton. The saponification of these substances must be complete, for if traces remain, the cotton will not be absolutely and fully absorbent.

It is possible to shorten the time of this boiling to four or five hours if the pressure in the kier is increased, but as a rule more uniform results obtain if the longer time is given. After the soda boil, the liquor is run off and the cotton given a fairly good washing, sufficient at least to reduce the temperature to normal.

The cotton is now ready for the bleach, which may be done either in the kier by cir-

culation of the liquors through the mass of cotton or by removing the cotton to large wooden circular or oval shaped vats, similar to pulp beaters, in which the bleaching is carried out. The strength of the bleach solution should be about 1 per cent. of chlorine and the bleaching should proceed to the limit, the bleach bath at the end of the run showing but little available chlorine. As a matter of fact, cotton being bleached for absorbent purposes is in reality partially oxidized or over bleached and responds promptly to the oxy-cellulose reaction with methylene blue.

Two different bleach solutions may be used, one prepared directly from bleaching powder, the other being a solution of hypochlorite of soda, and may be obtained either by decomposing bleaching lime, or by electrolyzing a solution of common salt. These different bleaching solutions will be considered further on.

After the bleaching has been done sufficiently, the cotton is well washed in plenty of water and afterwards soured with a 1 per cent. solution of muriatic acid, washed again and the whole mass of cotton subjected to a light boil with a 1/4 per cent. solution of caustic soda, again rinsed and treated to a second sour, the purpose of which is to remove as much as possible of the remaining traces of mineral matters, and washed again thoroughly. To remove the possibility of any chlorine odor remaining in the cotton, it is well soaked with a weak solution of antichlor, followed by a good wash. Opinions differ as to the anti-chlorine treatment. Some manufacturers prefer to give a final light soap wash, which leaves the cotton very soft, but unless all previous washes with plain water have been effective, so that no chlorine remains, it is best to omit the use of soap. From the preceding, it will be observed that the idea of the manufacturer is to produce an absolutely pure white cotton, which may contain small quantities of oxy-cellulose.

Regarding the bleach, a solution of chloride lime is commonly used, but where an absorbent cotton of special softness is desired, bleaching lime must not be used, as it is difficult to wash out, and also because it is the usual habit of bleachers to sour with oil of vitriol, a bad practice, as it forms at once sulphate of calcium on the fibers, which is impossible to remove. The presence of it causes the cotton to have a harsh feel. On the other hand, where sodium hypochlorite is used, no lime salts are present and the residual soda salts are readily washed out, irrespective of whether the sour is oil of vitriol or muriatic acid. Hypochlorite of soda is rapidly gaining favor with bleachers, not only on account of the above mentioned reasons, but on account of its uniformity.

Sodium hypochlorite is prepared from bleaching powder in the following manner:

Bleaching Powder	lbs. 500
Water	gals. 250

Work into a thick cream or paste by stirring, taking care to break all lumps.

Prepare a second solution by dissolving

Soda Ash	lbs. 300
Water	gals. 125

Boil by blowing steam through, and add

Water	gals. 60

The soda ash solution is now poured into the bleaching powder solution. The whole is well mixed for some time and allowed to settle, and the clear liquor drawn off without disturbing the sediment. This sediment is washed with several changes of water, allowing to settle after each wash, when it is drawn off and added to the main volume of the bleach, thus diluting it until it stands at 6° or 7° Tw., and yielding a total volume of about 900 gallons. To it is added 10 pounds of soda ash dissolved in a small amount of water, which will precipitate all remaining traces of lime. This solution is then ready for use as a stock liquor, and may have to be diluted for actual bleaching.

The electrolytic bleach is strictly a solution of hypochlorite of soda obtained by passing a current of electricity through a solution of common salt contained in a suitable apparatus, called an electrolyzer. This method of making bleach solutions is of great importance, and is ultimately destined

to displace the use of bleaching lime. After the cotton has been bleached and washed and freed from all impurities, it is dried and packed in a large sterilizing drum, where it is saturated with the vapors of formaldehyde.

It is not the purpose of the present article to discuss the subject of antiseptic dressings, but these consist of cotton that has been treated with various medicaments, such as carbolic acid, corrosive sublimate, iodoform, boric acid, etc. From the foregoing it will be seen that the most essential features of the entire process consist of a thorough alkaline boil, followed by a good rinse, then a bleach in a bath containing sufficient active chlorine to ensure the presence of oxy-cellulose, then a wash, followed by a sour to break up the remaining traces of the bleach.

With these operations conscientiously carried out, giving due regard to the washings, the manufacturer may have no fear of not complying with the official requirements.

Well made absorbent cotton should have the property of taking up from 18 to 20 times its own weight of water, and the way to determine this is to weigh out exactly 5 parts of the sample (absolutely dry) and immerse it for 5 minutes in pure water, remove carefully without excessive squeezing, and place in a small weighed funnel and allow to drain under slight pressure, and again weigh. Deduct the weight of the funnel from the combined weight of the funnel and the wet cotton, and divide by 5, the result will be the amount of water absorbed, in multiples of the original weight of cotton taken.

A PRACTICAL TALK ON BLEACHING COTTON FABRICS

BY JOHN D. STREET

Looking back to the earlier days of the industry and comparing the process used then with our up to date cut-all-corners methods, we are led to venture an opinion that if the bleacher could only get the "price," he would gladly return to some of the old time ways of handling cotton fabrics and thereby side step from a big batch of kicks which the average converter distributes around, not exactly for the purpose of keeping in practice, but generally to pave the way towards "allowances." The caustic boil and high pressure kier must be held responsible in a large measure for many complaints that the whites will yellow on storing. Unfortunately, the bleacher must make his work fit the remuneration he receives, and so long as the samples he submits appear as good as the original given him to follow, he should collect his full pay without deductions for any after complaint. However, the caustic boil and high pressure kier are here to stay and the object of this paper is merely to point out where perhaps, without increasing the cost of handling, better results can be obtained and which have been practiced successfully in some bleacheries.

In "ye olden days," the greys prior to the lime boiling were tramped down on a retting steep and for many hours warm water showered over them, the object being to loosen the adhering lint and dirt and to soften the size. The quantity of dirt thus soaked out did not enter the kier to be soused continuously for twelve to fourteen hours over the goods during the boil, but even this method had its defects. The grey plaited down in rope form would prevent a thorough cleansing and some dirt would get into the kier. Now for the remedy: We will assume that eight-tenths of the finished goods are singed. They go over the singer in the open. When the gas singer is used, the cloth generally goes through a small steamer, for the purpose of killing any sparks and restoring some lost vitality to the fabric. With the plate singeing machine the fabric is generally carried through a shallow pan containing water, for the purpose of extinguishing the sparks. After laying a while, the goods are run into the kier. It would be poor practice to attempt to run from the singeing machine to the kier continuously, because any wind-up or necessary stop would cause the fabric to burn on the machine, so a piling up at this point is obviously necessary. A more even saturation is always obtained when the fabric is in the open, so taking advantage of the open width from the singeing machine, and the shallow water pan already

installed, I would recommend that a tank or reservoir, containing a weak caustic soda or diastofor solution, be placed near the shallow pan and fed in the place of plain water. The fabric is guided to the bottom of the box to get a perfect saturation, then through a pair of squeeze rolls with a light set, through pot-eye and plaited down, then allowed to steep for six hours previous to entering into the kettle. The cost of the chemicals will be exceedingly small and there is no extra labor entailed, but the impregnation in the open and the retting will be equivalent to at least two hours of boiling.

THE PERMANENT FIREPROOFING OF COTTON GOODS

By Dr. William H. Perkin, Manchester, Eng., before the International Congress of Applied Chemistry.

Many disastrous accidents are on record which have been brought about by clothing catching fire: sometimes it is the case of a child whose garments have come in contact with a spark or lighted match and sometimes disasters of much greater magnitude have resulted from the ignition of costumes made of tow or other inflammable material on the occasion of charity entertainments or fancy dress balls.

It has long been recognized that impregnation with certain salts very much reduces and indeed may entirely destroy the liability of cotton goods to inflame and, of these fireproofing agents, I may perhaps be allowed to refer to a few only of the better known and more efficient. If a garment, after washing in the ordinary way, is rinsed in a solution containing alum or is starched with a starch containing a proportion of alum, the material, after drying, shows a marked reluctance to ignite, but this treatment has many draw-backs. In the first place it makes the material very dusty, and secondly the fireproofing is only of a temporary nature since it is at once removed by contact with water and the process must therefore be repeated every time the goods are washed. I can easily demonstrate this and, in these and all my other experiments, I purposely take only very narrow strips in order that any smoke produced may not cause inconvenience in this hall. Another solution which has been strongly recommended for the same purpose is made up with 3 parts of ammonium phosphate, 2 parts of ammonium chloride and 1 part of ammonium sulphate in about 40 parts of water. If the material after washing, is impregnated with this solution and dried, or if it is starched with starch made with the solution instead of with water, the dry material only ignites with difficulty, and, as it does not dust and is not prejudicially affected in any other way, this process has been used with advantage not only in connection with wearing material but also for the fireproofing of lace curtains and other inflammable decorations. But in this case also, the fireproofing agents employed are all soluble in water and one washing is sufficient to remove them entirely, leaving the goods at least as inflammable as before. The process must therefore be repeated every time the goods are washed and this means expense which, in the long run, becomes considerable.

But a much more serious drawback to processes of this kind is the trouble they entail since, in order to fireproof the garment the washerwoman must have alongside the ordinary wash tub, a second tub containing the fireproofing solution and this complication, added to the expense of the salts, has been shown to be so serious that processes of this kind are quite impracticable, especially in the homes of the poor. Again unless the materials or garments after washing, have been dried before immersion in the fireproofing solution, this solution cannot be kept uniform since, each garment being wet when put in leaves the solution weaker than before and therefore of less protective value. To dry each garment between the washing and the fireproofing entails so much trouble and labor and expense that it would obviously prevent any general adoption of the practice. Although the substances I have mentioned and the salts of ammonium in particular, possess in a high degree the property of rendering material fireproof, there is one substance which confers the property of resisting fire to cotton goods in such a remarkable degree that it has long

attracted attention and must be specially mentioned, and that is sodium tungstate.

A piece of muslin soaked in a weak solution of sodium tungstate and then dried is practically non-inflammable but unfortunately this salt is again so excessively soluble in water that a mere rinsing in clean water is sufficient to remove it completely and the fireproofing is lost. And this applies not only to sodium tungstate but also to all the other salts which have, from time to time, been recommended for fireproofing purposes; the result is not permanent because the proofing is at once removed when the goods are washed in the ordinary way.

The problem on which I was engaged for several years and which has now been successfully solved, in a very simple manner, was that of attempting to discover some process which not only made the goods non-inflammable but also permanently non-inflammable, and the researches on this subject were originally started in connection with flannelette, a material very largely and widely used for clothing, especially by the poorer classes, and one of the most, if not the most, inflammable of all cotton goods.

Flannelette may be briefly described as a kind of calico the surface of one or both sides of which has been "carded" or "raised" into a nap, the result being that the surface of the calico becomes covered with a fluff of minute fibers somewhat resembling a thin layer of cotton wool. This effect is produced by subjecting the surface of the calico to the action of a series of revolving rollers covered with a vast number of small pieces of sharp steel wire, which tear up the surface, and the material is passed over these rollers over and over again until the required amount of nap has been raised. The result of this superficial covering of nap is—as everybody who has handled flannelette will know—a warm, pleasant and cosy feel and this is no doubt due to a covering of air being imprisoned by the minute fibers, thus producing a layer which acts as a non-conductor much in the same way as in the case of flannel.

In the first two samples in the little book which you each received as you entered the hall are calico and flannelette and you will notice at once the great difference in the feel between the comparatively hard, flat surface of the calico and the raised surface of the flannelette.

Flannelette is indeed little, if at all, inferior to flannel as a non-conducting material and as it is very cheap and does not shrink in the wash, it has become very popular and is manufactured in enormous quantities and almost universally used for the clothing of children, especially in the homes of the poorer classes.

But it was not long before its increasing use showed unmistakably that it has one terrible drawback,—the nap, which is its peculiar feature, makes it highly inflammable and much more so than the calico from which it was manufactured. Flannelette is, in fact, as I have already said, very much like calico on the surface of which a thin layer of cotton wool has been spread and this layer is, of course, highly inflammable. I can easily demonstrate the difference in the inflammability of calico and flannelette by applying a light to strips of each, when it will be seen that while calico burns in the ordinary way, in the case of flannelette, the flame flashes over the whole surface of the fluffy cotton layer and travels with extraordinary rapidity.

It is, of course, this property which makes flannelette one of the most dangerous of materials for clothing purposes. The alarming frequency of deaths by burning due to the wearing of flannelette became common knowledge, the coroners all over Great Britain repeatedly called attention to the matter and by degrees the agitation against its use for clothing became so persistent that the Coroners' Committee of the Home Office was directed to enquire into the matter.

The Committee recognized that while, to quote the words of their Report, "We think the common opinion attributing to it (flannelette) a large share of the blame (of burning accidents) is not far wrong," that it was impossible to prohibit its use without causing great hardship, especially to the poor. Several years before this enquiry was held, one of the largest firms of flannelette manufacturers in Manchester, Messrs. Whipp Bros. and Tod, becoming alarmed at the frequent

occurrence of fatal burning accidents and fearing lest these might lead to the prohibition of the sale of the material, came to me and asked whether I would undertake a series of experiments with the object of endeavoring to find a remedy for this state of things and, after looking carefully into the matter, I consented to do what I could. That the problem was a difficult one from many points of view will be readily understood if I briefly state the conditions which had to be kept constantly in mind while the experiments were being carried on.

A process to be successful must in the first place not damage the feel or durability of the cloth or cause it to go damp as so many chemicals do, and it must not make it dusty. It must not affect the colors or the design woven into the cloth or dyed or printed upon it; nothing (such as arsenic, antimony, or lead), of a poisonous nature or in any way deleterious to the skin, may be used and the fireproofing must be permanent, that is to say, it must not be removed even in the case of a garment which may possibly be washed 50 times or more.

(To be continued.)

A NEW PROCESS OF FINISHING COTTON GOODS

An Austrian process for finishing textile fabrics, recently patented in the United States, is described by the inventor as follows: When finishing and loading or dressing cotton fabrics with the aid of viscose by itself or mixed with inorganic or organic loading materials or pigments or coloring matter the difficulty is met with that the cellulose which is regenerated from the viscose during its decomposition does not penetrate sufficiently into the fibers themselves and consequently is visible on the surface and fills up the meshes of the fabric. The same holds good of threads dressed with viscose in the manner known heretofore, when the cellulose was also regenerated more on the surface than in the interior. The consequence is that the fabric or dressed threads or fabric made of dressed threads loses the appearance and touch of the unfinished fabric.

With the new process the viscose is made so rich in caustic alkalis that its percentage of alkali is at least as great as its percentage of cellulose or cellulose hydrate. Such a mixture penetrates very deep into the textile fiber so that fabrics finished with it gain in touch, strength and weight, and are not far removed in appearance from, or are equal in appearance to, natural fabric or threads.

For carrying my process into practice crude viscose or viscose purified according to one of the well-known processes is applied to the fabric or spun goods to be finished. In order that the fibers may be penetrated still deeper this impregnation may take place in rarefied chambers or under an increased pressure. The viscose may have added to it other finishing or dressing agents or loading materials, such as kaolin, oxid of zinc, asbestos, staurolite (Taufstein) and the like, or inorganic or organic pigments, e. g., lax, mineral colors and the like, or coloring matter, either by themselves or mixed one with another. The abundance of caustic alkalis can be produced by providing therefor either when manufacturing the viscose, for example by converting the cellulose with the aid of suitably concentrated caustic potash solutions into alkali cellulose and adapting the pressure to which the same is subjected to the percentage of alkali which is finally desired and the like, or by adding to the finished viscose as much caustic alkali in a solid form or in solution as is desired for the purpose in view.

If it is wished to avoid the shrinking of the fabric or spun goods occasioned by the percentage of alkali or to diminish the same, it is preferable to finish or dress the fabric or spun goods or to render the viscose insoluble or to dry the fabric or spun goods while stretching.

The goods which have been finished or dressed and in which the viscose has been rendered insoluble must be liberated from the impurities due to the viscose. This is preferably done by a thorough washing process. The material may be washed with only cold or hot water alone or subjected in addition to the washing process to a neu-

tralizing process or one which removes the acid, to which end solutions of inorganic or organic acids or acid salts can be employed. This treatment with an acid or an acid salt can take place either before or after the washing process or between two washing operations. The alkali which passes into the water can be recovered by any process known in the art of mercerization or otherwise. Following are a number of examples of finishing by this process:

1. One hundred parts by weight of a crude viscose containing 10 to 15 per cent. cellulose and 3.5 to 7 per cent. caustic soda are mixed with 30 to 150 parts by weight of a soda lye of 50° Be. (50 per cent.), and a cotton fabric is finished with this mass on a suitable finishing machine or a cotton thread is dressed on a suitable dressing machine. The treatment is completed according to one of the processes described above.

2. Ten to twenty parts by weight of china clay or oxid of zinc are added to the mass described in Example I.

3. Ten to twenty parts by weight of a softening agent, such as glycerin, Turkey red oil, aluminium oleate, polyricinol acid, castor oil, sugar, syrup and the like, are added to the mass described above in Example 1 or 2.

4. Ten to twenty parts by weight of starch or glue dissolved in a suitable quantity of water are added to the mass described above in examples 1, 2 or 3.

5. Like examples 1 to 4, but with the difference that, instead of the crude viscose, a solution of a precipitate obtained with the acid of sodium chlorid or ammonium sulphate or chlorid of zinc or alcohol from alcoholic crude viscose or crude viscose neutralized with a weak acid is employed, said solution having the same percentage of cellulose.

The shipments of silk hosiery to the United States from Chemnitz in 1911 showed a drop of $130,002 or 67 1/2 per cent. The average price for the past year was $2.43 per dozen as compared with $2.57 in 1910. In woolen hosiery the exports in 1009 amounted to $44,206 compared with $24,065 in 1911.

Dye Recipes

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD RECORD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16-page pamphlet, in convenient form for preservation. Subscription price for the Dyers' Supplement $1.00 per year.

Recipe No. 145

BLUE ON COTTON YARN

Chlorazol Brilliant Blue 3 B on 100 lbs. cotton yarn. Prepare the dye bath with

5 lbs. Chlor. Brilliant Blue 3 B.
(Read Holliday & Sons, 11 Gold St., New York, N. Y.)
2 lbs. Common Salt.

Prepare the dye bath in the usual manner.

Chlorazol Brilliant Blue 3 B is very well adapted to union dyeing, and possesses excellent fastness to rubbing. No mordanting is required, thus saving time, steam and labor, coupled with a softer handle of the goods.

Recipe No. 146

BLUE ON COTTON YARN

Chlorazol Brilliant Blue 3 B Conc. on 100 lbs. cotton yarn. Prepare the dye bath with

3⅓ lbs. Chlor. Brill. Blue 3 B Conc.
(Read Holliday & Sons, 11 Gold St., New York, N. Y.)
20 lbs. Common Salt.

Prepare the dye bath in the usual manner.

Chlorazol Brilliant Blue 3 B is very well adapted to union dyeing, and possesses excellent fastness to rubbing. No mordanting is required, thus saving time, steam, labor, coupled with a softer handle of the goods.

Recipe No. 147

BROWN ON CHROME MORDANTED WORSTED YARN

Anthracyl Chrome Brown D on 100 lbs. chrome mordanted worsted yarn. First mordant the yarn in a bath containing

3 lbs. Potassium Bichromate,
3 lbs. Potassium Bitartrate,

working at a boil for 1 1/2 hours.

Then dye in a bath made up with

3 lbs. Anthracyl Chrome Brown D.
(F. E. Atteaux & Co., 174 Purchase St., Boston, Mass.)

Enter at 120° F., and dye at a boil for 1 to 1 1/2 hours.

Anthracyl Chrome Brown D when dyed on a chrome mordant produces a much fuller shade. The color is not sensitive to copper and as it requires plenty of acid, it has a decided value in dyeing carbonized goods or carbonized wool, shoddy or rags. It distinguishes itself by its excellent leveling capacity with the result that evenness in dyeing is assured.

Recipe No. 148

RED ON COTTON YARN

Thio Indigo Red 3 B Paste on 100 lbs. cotton yarn. Prepare the dye bath with

20 lbs. Thio Indigo Red 3 B Paste.
(Kalle & Co., 530 Canal St., New York, N. Y.)
7 lbs. Caustic Soda.
4 lbs. Hydrosulphite Powder Conc.

The reduction is carried out at 130° F., and the bath will have an olive green color when the reduction is complete.

The material is worked in the dye bath at a temperature of 90 to 105° F., for 3/4 of an hour. Then rinse and finish in a boiling soap bath.

Recipe No. 149

BLUE ON COTTON YARN

Azidine Blue B X on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Azidine Blue B X.
(C. Bischoff & Co., 451 Washington St., New York, N. Y.)
20 lbs. Common Salt.

Dye at a boil for one hour.

Azidine Blue B X gives a blue shade which does not bronze in high percentages.

Recipe No. 150

BROWN ON WORSTED YARN

Chrome Fast Brown R on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Chrome Fast Brown R.
(Berlin Aniline Works, 213 Water St., New York, N. Y.)
20 lbs. Glauber's Salt.
2 lbs. Sulphuric Acid.

Enter at 120° F., raise to a boil in 3/4 of an hour, and boil for 1/2 hour. Then add

2 lbs. Sulphuric Acid,

and continue the boiling for 1/2 to 3/4 of an hour, to exhaust the bath. Finally after-treat in the same bath by adding

1½ lbs. Potassium Bichromate,

and boiling for 3/4 of an hour.

Chrome Fast Brown R possesses good fastness to light and weather. This color may also be dyed on a chrome mordant.

Recipe No. 151

YELLOW ON WORSTED YARN

Cloth Yellow R on 100 lbs. worsted yarn. Prepare the dye bath with

2 lbs. Cloth Yellow R.
(Geisenheimer & Co., 189 Front St., New York, N. Y.)
10 lbs. Glauber's Salt.
3 lbs. Acetic Acid.

Enter at 120° F., and dye at a boil for 3/4 of an hour. Then add

1 lb. Sulphuric Acid,

and continue the boiling until the bath is exhausted. Finally add

1½ lbs. Potassium Bichromate,

and continue the boiling 3/4 of an hour.

Cloth Yellow R will be found of value in the dyeing of material containing cotton and silk effect threads. Its fastness in general is good.

Recipe No. 152

BLACK ON COTTON YARN

Kryogene Black T G E on 100 lbs. cotton yarn. Prepare the dye bath with

10 lbs. Kryogene Black T G E.
(Badische Co., 86 Federal St., Boston, Mass.)
20 lbs. Sodium Sulphide Crystals.
10 lbs. Soda Ash.
50 lbs. Common Salt.

Bring the dye bath to a boil, enter material and dye at a temperature just under the boil for one hour.

Kryogene Black T G E possesses the usual fastness of the sulphur colors.

Recipe No. 153

GREEN ON COTTON YARN

Dianil Fast Green B on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Dianil Fast Green B.
(Farbwerke-Hoechst Co., successor to H. A. Metz & Co., 122 Hudson St., New York, N. Y.)
25 lbs. Common Salt.
2 lbs. Soda Ash.

Dye at a boil for one hour.

Dianil Fast Green B is easily soluble, dyes level, and the shades are fast to acid, and hot pressing.

Recipe No. 154

BLUE ON COTTON YARN

Isamine Blue 8 B on 100 lbs. cotton yarn. Prepare the dye bath with

1½ lbs. Isamine Blue 8 B.
(Cassella Color Co., 182 Front St., New York, N. Y.)

3 lbs. Glauber's Salt.
2 lbs. Acetic Acid.

Dye at a boil for one hour.

Isamine Blue 8 B produces very bright, clear shades, which possess good fastness to light and washing.

Recipe No. 155

BROWN ON WORSTED YARN

Anthracyl Chrome Brown D on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Anthracyl Chrome Brown D.
(F. E. Atteaux & Co., 174 Purchase St., Boston, Mass.)
10 lbs. Glauber's Salt.
3 lbs. Sulphuric Acid.

Boil for one hour, and add

1 to 3 lbs. Potassium Bichromate,

and continue the boiling for 3/4 of an hour.

Anthracyl Chrome Brown D produces beautiful shades of brown, particularly the light shades, which are fast to light and washing, and will also stand heavy fulling. The color dyes very clear shades. It is also a very level dyeing color for piece-dyeings, yarn and raw stock.

Recipe No. 156

VIOLET ON COTTON YARN

Chloramine Violet F F B on 100 lbs. cotton yarn. Prepare the dye bath with

2 lbs. Chloramine Violet F F B.
(Farbenfabriken Co., 117 Hudson St., New York, N. Y.)
30 lbs. Glauber's Salt.
1 lb. Soda Ash.

Dye at a boil for one hour.

Chloramine Violet F F B possesses the properties common to the direct cotton colors.

Recipe No. 157

RED ON COTTON YARN

Thio Indigo Red B Paste on 100 lbs. cotton yarn. Prepare the dye bath with

20 lbs. Thio Indigo Red B Paste.
(Kalle & Co., 530 Canal St., New York, N. Y.)
5 lbs. Caustic Soda.
5 lbs. Hydrosulphite Powder Conc.

The reduction is carried out at 140° F., and the dyeing is done at ordinary temperatures, for 3/4 of an hour.

Thio Indigo Red B Paste possesses excellent fastness to light, poor fastness to washing and rubbing, and good fastness to chlorine.

Recipe No. 158

BLACK ON COTTON YARN

Columbia Fast Black D Extra on 100 lbs. cotton yarn. Prepare the dye bath with

4 lbs. Columbia Fast Black D Extra.
(Berlin Aniline Works, 213 Water St., New York, N. Y.)
30 lbs. Glauber's Salt.
2 lbs. Soda Ash.

Dye at a boil for one hour. Then after-treat for 1/2 hour, at 120° F., in a bath made up with

2½ lbs. Formaldehyde (40%).

Columbia Fast Black D Extra possesses good fastness to light, washing, rubbing, and hot pressing.

Recipe No. 159

YELLOW ON COTTON YARN

Thiogene Yellow G H Conc. on 100 lbs. cotton yarn. Prepare the dye bath with

5 lbs. Thiogene Yellow G H Conc.
(Farbwerke-Hoechst Co., successor to H. A. Metz & Co., 122 Hudson St., New York, N. Y.)
13 lbs. Sodium Sulphide (Crystals).
5 lbs. Soda Ash.
40 lbs. Common Salt.

The dyestuff is dissolved together with the sodium sulphide, and then added to the dye bath which already contains the soda ash and the common salt. The dyeing is carried out for one hour near the boiling point. The material is then thoroughly rinsed and finally rinsed in a bath containing

5 lbs. Acetic Acid,

for complete development of the shade.

Thiogene Yellow G H Conc. is very soluble and dyes level, and possesses good fastness to washing, light, acid, and hot pressing.

Recipe No. 160

BLACK ON COTTON YARN

Diamine Neron B B on 100 lbs. cotton yarn. Prepare the dye bath with

5 lbs. Diamine Neron B B.
(Cassella Color Co., 182 Front St., New York, N. Y.)

25 lbs. Common Salt.

Dye at a boil for one hour. Then diazotize in a cold bath made up with

2½ lbs. Sodium Nitrite.
7 lbs. Hydrochloric Acid, 32° Tw.

Rinse and develop in a cold bath made up with

½ lb. Phenylene Diamine.
½ lb. Resorcin.

Diamine Neron B B gives an excellent shade of jet black which if diazotized and developed will be found to possess good fastness to washing.

New Machinery and Processes

This department is designed to present from month to month a brief mention of new machinery, devices and processes being brought out in this country and abroad, that are of interest to the textile manufacturers. It is not a list of patents but of improvements on the market, the idea being to present to our readers a systematic monthly record of new machinery, etc., of interest to textile mill men.

Whenever possible we endeavor to make a personal investigation of the new machinery and processes described in this department. In the absence of such personal investigation we must necessarily rely upon information obtained from those who control the machines and processes.

We invite machine builders and others to send us such information for this department.

Electric Light for Sewing Machines. The Hinsdill Electric Co., Troy, N. Y. An electric lamp and shade for throwing light on the needle of a sewing machine. A description of the fixture will be found in another part of this issue.

Vertical Centrifugal Pump. The Goulds Mfg. Co., Seneca Falls, N. Y. An improved vertical centrifugal pump, a description of which appears in this issue.

Emery Finishing Machine. L. H. A. Schwartz & Co., 50 Central St., Boston, Mass., are the American agents for an improved emery finishing machine for cloth which is built by the A. Monforts Maschinenfabrik, M. Gladbach, Germany. A description of the machine appears in this issue.

Plush Splitting Machine. L. H. A. Schwartz & Co., 50 Central St., Boston, Mass., are placing on the American market the Monforts plush splitting machine for opening up and getting a better covering on pile fabrics, such as plush, velvet, etc. The machine is in extensive use in Germany and gives a very superior finish.

Necktie Knitting Machine. The Climax Machine Co., 1755 N. Howard St., Philadelphia, Pa., have recently brought out an improved and fully automatic circular knitting machine for neckties. A description appears in this issue

Perforated Tubes for Yarn. Rugendas & Co., Augsburg, Germany. A perforated tube on which yarn is wound for the dyeing machine.

Printing Machine. Gebrueder Friese, Kirschau, Germany. A printing machine for printing both back and face of textile fabrics at one operation.

Lease Reed. Gustav Liehr, Weigelsdorf, Germany. A lease reed by which a lease can be instantly obtained in the warp. It has been found useful in German mills on slashers.

Hand Card. Josef Kern & Schervier, Aachen, Germany. A hand card consisting of an aluminum frame in which the clothing is fastened. It combines strength with light weight. The clothing when worn out can be easily replaced.

Stripping Yarn from Bobbins. Kollnauer Baumwollspinnerei & Weberei A. G., Kollnau, Germany. A device for removing yarn from bobbins and cops.

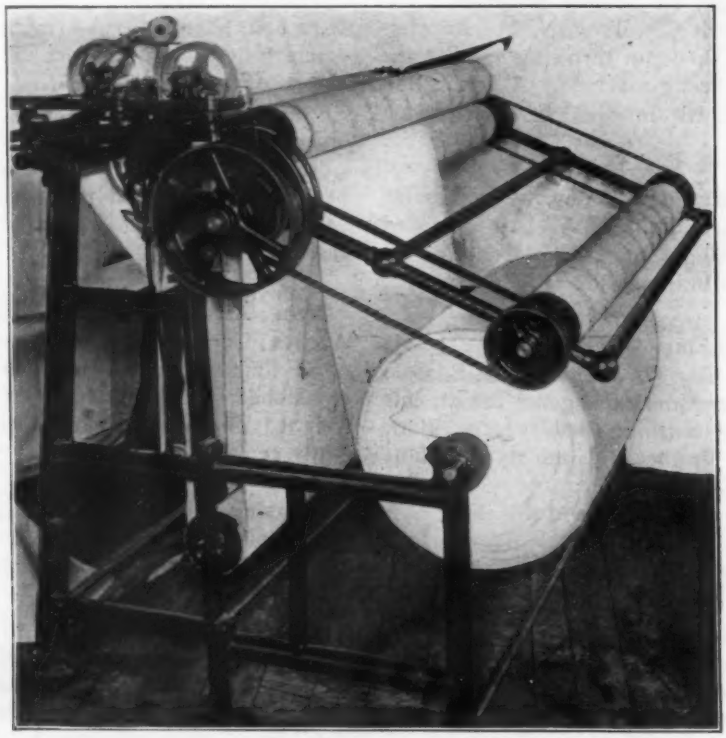
Reclaiming Alkali in Mercerizing. J. P. Bemberg, Rittershausen, Germany. An improved apparatus for reclaiming caustic alkali from waste mercerizing liquor. Alfred Suter, 5th Ave. Bldg., New York, is the American agent for the German builders.

Scouring Machine. Moritz Jahr, Gera, Germany. An apparatus for scouring textile materials by the benzine process.

Fulling Mill. Wilhelm Quade, Guben, Germany. A rotary fulling mill having an attachment for automatically stopping the machine when the pieces have run for the desired length of time, the object being to prevent overfulling.

THE BAIRD SELVAGE PRINTING MACHINE

Should a "pure fabric" law ever be created, making it compulsory for the manufacturer of textiles to mark the component materials upon their productions, they will find in the Baird selvage printing machine a ready means of doing so without in any way disfiguring the goods. This machine is built by Robert Baird, 66 Leonard St., New York. By this improved method of trademarking fabrics, a full description, if necessary, can be printed, in one continuous line, right along the selvage, in neat, clean-cut permanent lettering, no matter how irregularly the goods may have been rolled or folded. It may be many years before the proposed legislation is seriously considered by our law makers. In the meantime many prominent manufacturers and finishers of good honest fabrics, especially those who know the value of advertising, are finding it greatly to their advantage to mark their goods in such a manner that fraudulent substitution is prevented. The former obstacles to doing so are removed by the Baird process. Names or trademarks can be printed at short intervals along the selvages, regardless of the weight of the goods. The retail distribution is also much facilitated. The merchant, by handling goods that have, what practically amounts to a guarantee, permanently stamped upon them, can make ready sales without argument or contention, for what manufacturer would be foolish enough to affix his name to poorly made goods.



THE BAIRD SELVAGE PRINTING MACHINE

Previous to the perfecting of the Robert Baird machine it had been practically impossible to print clean-cut lettering upon anything but smooth selvaged cotton fabrics in light colors or white, on account of the ordinary printing type not being capable of holding an ink sufficiently heavy and opaque to leave a good impression. Even on the

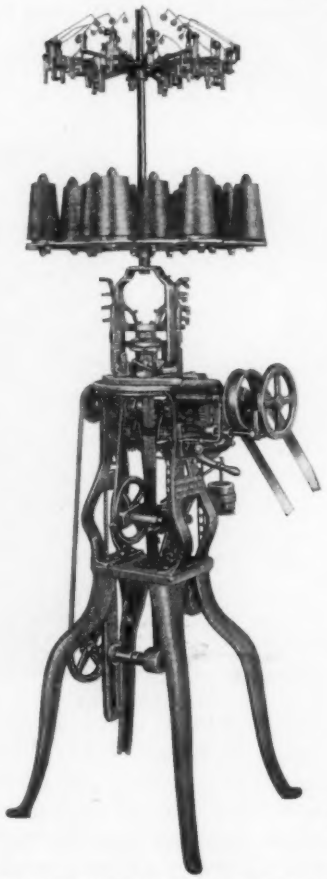
fabrics most suitable for such printing, considerable blurring or unevenness would occur. By this improved method it is possible to apply directly onto the fabric without any intermediate process, inks of such body and composition that the letters will stand out in strong bold relief even on coarse worsteds, shiny mohairs, or heavily selvaged velveteens.

Another distinct advantage is that in printing on aluminum, which is generally preferred for dark fabrics, the metallic powder stays where it is put, and does not rub off with handling and scatter over the goods. The inks used in the Robert Baird process are made in all colors, and can be had absolutely indelible, or readily removable in cold water. The Baird machines are now in use in some of the most important weaving and finishing plants in this country and abroad.

AN IMPROVED NECKTIE MACHINE

The illustration shows the new and entirely automatic circular necktie knitting machine which the Climax Machine Co., 1755 N. Howard St., Philadelphia, Pa., are placing on the market. It can be operated either on single or double feed. The Climax Machine Co. are the pioneers in the manufacture of machinery to stripe and plate in four separate colors with eight fingers, four on each side, and sixteen bobbins. A number of new features have been adopted in the new machine. One of them is a locking device to be used in the manufacture of high grade ties having a very thin neck band, the body being of such fine texture as to give the appearance of a woven tie, but having the advantages of the knit fabric. An unlimited variety of patterns can be knit in accordion, crochet, lace and plated work, including open work, arrow points, squares, honey comb, zig zag, diamond, vertical, horizontal and spiral stripes.

The machine is built of gray iron and high carbon interchangeable steel cams and cylinders; the fingers and cams which operate together are made of phosphor bronze because of its toughness and wearing qualities. The pattern and stitch tightening chains are of the link interchangeable type. Eccentrics, ratchets and pawls are substantially arranged by being countersunk or pinned to prevent drop stitches and getting out of time. The cylinder heads are arranged with tucking finger adjustment to take care of one or two pattern wheels, according to the class of work desired. The striping drums



THE CLIMAX AUTOMATIC NECKTIE KNITTING MACHINE

and tuck wheel are arranged with threaded steel pins of standard size, for simplicity and the quick change of pattern. The tension top and take-up are adjustable to give an even tension, which is a very important feature in this class of work.

The Climax Machine Co. will submit samples and give further information on request. The machine can be seen in operation at the shops of the company.

BLAUGAS FOR LIGHT, HEAT AND POWER

Several years ago Herman Blau, a chemist of Augsburg, Germany, after a long series of experiments, discovered what is now known as "blaugas." This is an illuminating and heating gas in liquid form, which can be easily transported to localities having no regular gas supply. It meets all of the necessary qualifications by being non-poisonous, comparatively safe from explosion, easy to handle, reasonable in price, and condensed to a small compass.

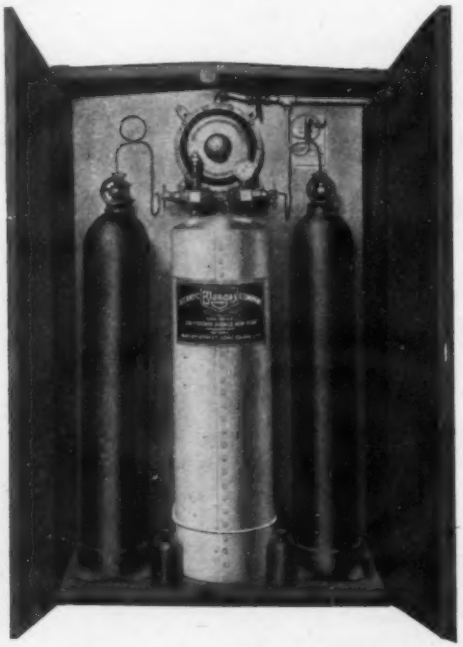


FIG. 1. STEEL CABINET CONTAINING "BLAUGAS" OUTFIT

Blaugas is a mixture of those hydrocarbon gases which, under ordinary pressure and temperature, are in a gaseous form, but which will liquefy under high pressures and low temperatures. These so liquefied hydrocarbons contain, absorbed or dissolved therein, under the pressure and temperatures employed in the Blau process, a large quantity of the nearly related gases and a small quantity of the so-called permanent gases, especially methane and hydrogen, the whole forming an aggregate of hydrocarbons which, under high pressure and normal temperature, remains a liquid, but which, when released under nearly atmospheric pressure and normal temperature, will be completely reconverted into a gaseous aggregate.

Blaugas contains a large quantity of the heavier hydrocarbons and a relatively small quantity of the permanent gases, therefore it is very rich in heat value. A great many tests made by various investigators have shown that one cubic foot of expanded blaugas yields from about 1,800 to 2,000 B. t. u. against about 625 B. t. u. per cubic foot of ordinary coal gas and about 1,500 B. t. u. of acetylene. Therefore, the heat value of one cubic foot of expanded blaugas is more than three times that of ordinary coal gas; as one cubic foot of liquefied blaugas expands into 400 cubic feet, these 400 cubic feet will equal in heat value more than 1,200 cubic feet of ordinary coal gas.

Blaugas is furnished under a high pressure, therefore it is necessary to reduce its pressure before it enters the service pipes, which is done by reducing and regulating valves. This produces, without any further artificial means, so-called pressure gas, which is of very great value for illuminating

purposes and for use in the arts. Because of its high pressure and great heat value, it is the most efficient commercial gas known for illuminating, heating and cooking purposes, one cubic foot of blaugas giving approximately 80 candles in an inverted incandescent burner, whereas ordinary coal gas will yield 90 candles with a consumption of five cubic feet. For industrial purposes, where a uniform heat of high pressure is required, blaugas has proved most efficient and is now used in this country in a great many laboratories, factories and industries.

Blaugas is shipped in steel bottles containing from 20 to 25 pounds of liquid gas. Each pound of liquid gas will yield 12 1/2 cubic feet of expanded gas. Blaugas can also be furnished in larger or smaller bottles.

Blaugas has an explosive range of only 4 per cent. as compared with 13 per cent. for ordinary coal gas and 47 per cent. for acetylene. The steel bottles containing blaugas are placed in a small steel cabinet, Fig. 1, which is about three feet wide, five feet high and sixteen inches deep. In this cabinet, which is called the "expander box," the gas is permitted to escape from the bottles by proper reducing valves into an expansion tank, from which the gas flows through a pressure regulator into the house pipes or wherever the gas is to be used. Nothing else is required but to detach empty bottles and attach full ones. No removing of refuse, no changing of valves, no handling of anything but the full and empty bottles is required. The exchange of bottles can be made by any person without any prior experience.

As blaugas is sold by weight, which is very readily ascertained, the necessity of meters is obviated. When bottles are empty they are returned to the factory to be exchanged for full ones. Two bottles are always connected with the system, one in use and the other as a reserve.

Being piped in the same manner as other gas, blaugas is well adapted where light and heat are required. Blaugas, which is a patented article, is manufactured by the Atlantic Blaugas Co., 381 Fourth Ave., New York. It is stated that one pound of blaugas costing ten cents will maintain a sixty-candle power inverted light for seventeen hours, or at the rate of three-fifths of a cent an hour. In lights of larger candle powers, the cost increases in proportion to the power of the light. The Blaugas Co. gives the following statement of the cost of blaugas and other illuminating agents:

LIGHT OBTAINED FOR TEN CENTS

	Candle Power Hours
Blaugas at 10c. per lb.	1000
Acetylene at $70 per ton carbide (1 lb. yielding 4.5 cu. ft.)	640
Gasoline, 87 gravity, 18c. a gal.	910
Electricity at 12c. per k. w. hour:	
Carbon filament	265
Tungsten filament	790
Kerosene at 15c. per gal.	465
City Gas at $1.50 per 1000 cu. ft.:	
Open flame	293
With mantle	1200
Candles at 25c. per lb.	38

Blaugas will undoubtedly prove of great value for many textile purposes. Not only for individual processes such as singeing, but also for supplying light for entire plants. We recently heard of a case where the building of an underwear mill had been delayed, waiting for a supply of electric power. The manufacturer heard of blaugas and after making investigations proceeded with the building of the plant, light for which is to be obtained from blaugas.

The value of blaugas has been demonstrated in a striking manner in the building of the Boston subway, one of the contractors informing us that the use of this gas has made it possible to complete the subway six months earlier than would have otherwise been the case.

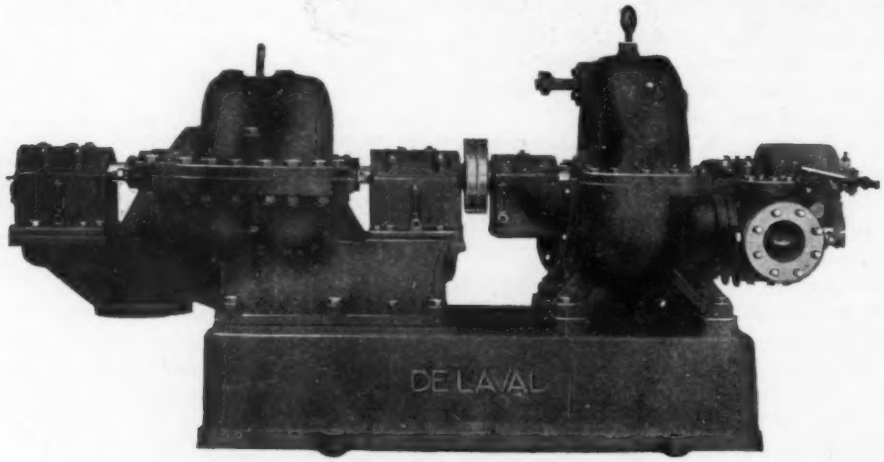
A NEW STEAM TURBINE WITH VELOCITY STAGES

The chief requirements for small turbines are safety, hardiness, and, in many circumstances, steam economy. Safety depends primarily upon the reliability of governing devices and upon the strength of parts, as determined by design and materials used, and upon measures taken to prevent destruction of the machine and its surroundings in case runaway should occur. Hardiness, or the ability to run for long periods without attention or repair, should

have combined with it accessibility and cheapness of maintenance.

The practical application of these points is demonstrated by a new line of velocity-staged turbines recently brought out by the DeLaval Steam Turbine Co., of Trenton, N. J. The speed governor consists of two governor weights pivoted on knife edges and made of steed, this ring effectually prevents the escape of fragments which might penetrate the ordinary cast iron housing.

The housing itself consists of two parts, the cover, which may be raised readily, rendering the wheel, shaft and all interior parts accessible at once, and the lower part, containing the steam inlet and outlet openings.

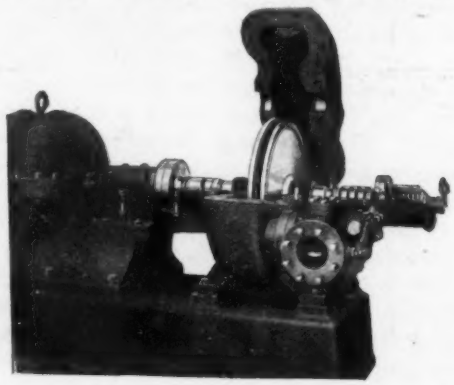


SIDE VIEW OF DE LAVAL CLASS "C" TURBINE
Upon lifting off the casing cover all internal parts of the turbine may be inspected, and after removing the bearing caps and uncoupling the shaft all parts may be removed from the casing.

compressing a helical spring arranged with the axis concentric with the axis of the shaft. The tension of the spring may be adjusted to give the speed regulation desired. The governor is completely enclosed in a stationary casing, presenting no external moving parts.

By means of this relatively simple governing device, close regulation is secured, but it is not good practice to depend upon a single governing device. A second speed-limiting device or "emergency" governor is employed. This emergency governor is entirely independent of the speed governor and comes into action whenever a certain speed is exceeded, regardless of the action of the speed governor. Even with both of these protective devices, however, some accident might conceivably happen through which overspeeding would occur, with consequent rupture of the wheel. In the present turbine an enclosing armor is therefore provided in the form of the ring in which the stationary guide buckets are held. Being

Freedom from vibration is accomplished primarily by careful balancing of rotating



DE LAVAL CLASS "C" TURBINE
with bearing caps removed and the cover lifted, permitting inspection of all parts.

parts and by the use of a shaft so proportioned that its critical speed is far above the normal speed of operation. It is made of hammer-forged open-hearth steel, ground and polished over its entire surface on a

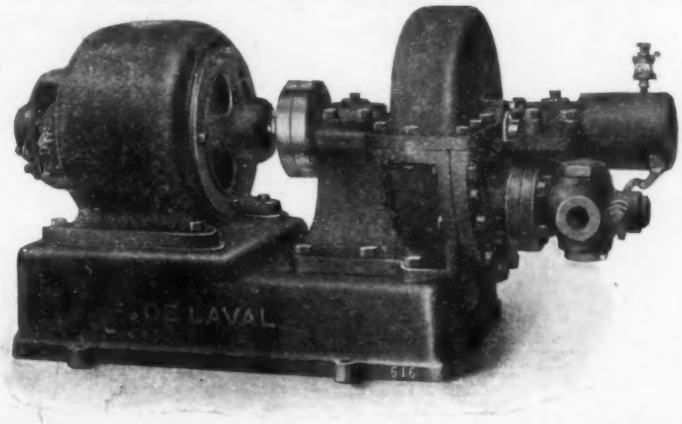
dead center grinder, thus insuring perfect alignment.

The wheels are forged steel discs, finished and ground on all surfaces, and thickened toward the center to withstand safely rotating speeds far in excess of the normal speed of the turbine. They are centered on the shaft by ground fits and are secured by Woodruff keys, the whole series being located on the shaft by a collar and held in place by a heavy lock nut. Each wheel is carefully balanced, as is also the series after assembling upon the shaft. Each wheel carries but one row of buckets. Besides the bearings, about the only parts of a steam turbine that are subject to wear are the nozzles, buckets and the guide vanes. The prevention of wear is largely a matter of supplying dry steam only and of using suitable materials and having a suitable finish for the buckets and blades. Long experience with high velocity steam jets has shown the builders of the De Laval turbine that the most satisfactory form of bucket to resist wear is a drop forging of suitable noncorrodible metal, upon which the original scale formed in the drop forging process has been allowed to remain.

The buckets of the present turbine are made of nickel bronze by this process and are inserted in the rim of the wheel by bulb shanks fitted into slots milled and bored in the rim transversely to the plane of the wheel, a mode of attachment which develops the full strength of the bucket and at the same time permits of removing or replacing individual buckets without disturbing others.

Closely allied to reliability is ease of access to the parts of the turbine for inspection, repair or replacement. In the present turbine, all internal parts are at once accessible upon removing the casing cover and without disconnecting either the steam supply or exhaust piping. Upon removal of the bearing caps and unbolting the coupling, the rotating member may be taken out, which gives access to all parts of the turbine.

WHEEL OF DE LAVAL CLASS "C" TURBINE
The drop-forged buckets are fastened in the rim of the wheel by bulb shanks. A separate wheel is used for each row of buckets.



SMALL DE LAVAL CLASS "C" TURBINE DRIVING DIRECT CURRENT GENERATOR, 3½ KW.

Each and every part that will be worn by wet steam or from any cause whatsoever, is

machined to limit gages and is perfectly interchangeable, so that it may be quickly and cheaply replaced.

Good steam economy is often desirable even in small turbines and some of the features of construction which have an influence in this direction mentioned in preceding paragraphs may be recapitulated; it is important that the proper ratio between bucket speed and the spouting velocity of the steam be maintained, that the loss by

INDIVIDUAL NOZZLE OF DE LAVAL CLASS "C" TURBINE

The interior of the nozzle is carefully bored and reamed to the proper shape, a removable plug in the nozzle giving access to the steam inlet opening.

skin friction of the disc revolving in the steam and the fan action of the buckets be reduced to a minimum, that nozzles and buckets be of an efficient form and constructed of material favorable to the retention of this form and that the nozzles be operated at full pressure as much of the time as possible.

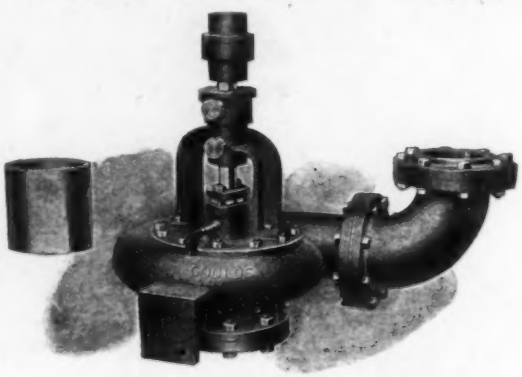
The only method of governing that is practicable for turbines of small size is by throttling and in fact throttling has been found to give the most satisfactory results in turbines of all sizes where arrangements are also made for turning on and off nozzles, as required to meet the demands for power. In one of the turbines illustrated herewith and containing ten nozzles, six are fitted with hand-controlled valves and may be cut out of service when the demand for power is light.

The nozzles themselves consist of solid bronze castings in which the orifice through which the jet is delivered is carefully bored and reamed to the shape adapted to secure the desired ratio of expansion and the delivery of a jet free from turbulence and of which all elements are truly parallel. In the heel of the nozzle piece is a plugged hole through which access is had for machining the throat of the orifice.

These nozzles communicate with the steam chest cored out in the wall of the wheel case and are held by nuts and sealed with copper gaskets. They can be removed easily if it should ever be necessary to replace them, as in case it should be desired to operate the turbine under steam conditions different from those for which it was originally designed. Inasmuch as full expansion takes place in the nozzle, the only parts of the turbine coming in contact with steam at boiler temperature or pressure are the steam chest and the inlet ends of the nozzles, the wheel case proper being filled with steam at exhaust temperature and pressure. Thus the stuffing boxes are not subjected to pressure greater than that of the exhaust.

GOULDS NEW VERTICAL CENTRIFUGAL PUMP

The illustration shows the latest pump added to the new line of centrifugal pumps developed by The Goulds Manufacturing Company, Seneca Falls, N. Y. This pump



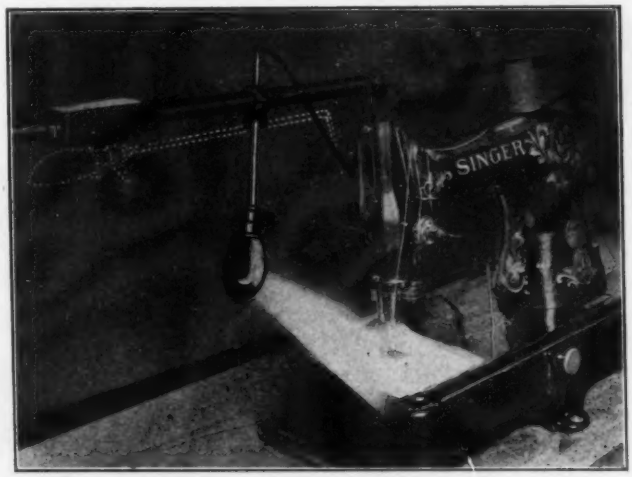
A NEW VERTICAL CENTRIFUGAL PUMP

is of the vertical type for service where it is necessary to pump from a pit. It can be operated submerged when this is desirable. The impeller is of the enclosed type; and the

design is such that the end thrust is practically negligible. A ball thrust bearing carries the weight of the impeller and shaft. A water sealing ring is provided, making it unnecessary to draw the gland up tight, insuring low friction losses. For special liquids which attack iron, these pumps can be furnished brass fitted or made entirely of brass. They are adapted for belt drive or direct connection to electric motors or other drivers.

INDIVIDUAL SYSTEM OF LIGHTING

The Hinsdill Electric Co., of Troy, N. Y., have placed on the market a universal adjustable fixture with special lamp and shade whereby the light may be projected directly upon the needle of a sewing machine. This prevents the light from shining in the operator's eyes, results in more perfect work and places the light where needed. It is considered a great improvement over the old form of pendant lights which hang over the table. By using the Mazda lamp there is a great saving over the carbon filament. It gives 12 operators a light with no more current consumption than one carbon filament 16 c. p. lamp. Among the recent users of this system are the Clark Textile Co., Saratoga Springs, N. Y., Ormsby-Morris Co., Waterford and numerous others.



A SPECIAL LAMP AND SHADE WHICH THROWS THE LIGHT DIRECTLY ON THE NEEDLE OF A SEWING MACHINE

THE USE OF LOW-PRESSURE STEAM

The utilization of low-pressure steam in prime movers has engaged the attention of engineers all over the world. It is therefore interesting in this connection to note the opinion expressed by Charles T. Main, engineer of Boston:

"When power is produced by steam, only a small percentage of the total heat in the steam is utilized for power; a very large percentage goes to waste in the form of exhaust steam or in water of condensation.

"If low pressure steam is needed for heating and manufacturing purposes, it can be used after it has passed through the engine and produced power, and its use in this manner is increasing constantly. It results in a large saving over taking steam direct from the boilers for heating and manufacturing purposes and allowing the heat which is rejected from the engine to go to waste.

"If steam is used for power exclusively the compound (condensing) engine is the most economical type of engine to use for manufacturing purposes.

"If more or less low pressure steam is required for other purposes than power this type can be used to advantage, except in such cases as require nearly the same amount of low pressure steam as would be exhausted from an engine producing the

amount of power required. In such cases as this the proper type to use would be the simple high pressure engine.

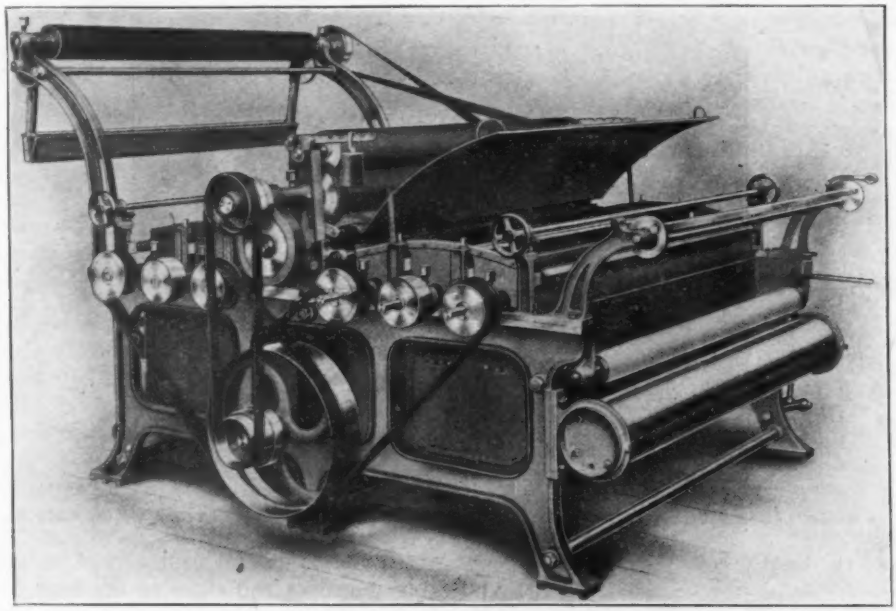
"Between the two extremes, of steam used for power only and an amount of low pressure steam used equivalent to the whole amount exhausted from the engine, lie nearly all the cases of ordinary practice.

"The proper sort of engine to use in these cases is the compound (condensing) engine from the receiver of which as much low pressure steam can be taken as is required for the various heating purposes to which it is put, the remaining steam in the receiver passing into the low pressure cylinder. The ratio of areas of the high and low pressure cylinders is determined by the average per cent. of steam exhausted from the high pressure cylinder which is taken into the low pressure cylinder.

"The saving from using the exhaust of a non-condensing engine, which would otherwise go to waste, is large, because there is no additional steam required for the engine, unless the back pressure is increased. Any use of the steam is nearly all clear profit, and, if all of it is used, the only part left to charge to power is the difference in B. t. u. due to the difference in pressure and the condensation in the engine cylinder and jackets. There seems to be no good reason why in time the practice of bleeding turbine should not become as common as bleeding engine receivers."

AN IMPROVED EMERY FINISHING MACHINE FOR CLOTH

The illustration shows the emery finishing machine built by A. Monforts Maschinenfabrik, M. Gladbach, Germany, and for which L. H. A. Schwartz & Co., 50 Central St., Boston, Mass., are the sole American agents.



AN EMERY FINISHING MACHINE FOR CLOTH

This machine is provided with six emery rollers, three of which work on the face of the cloth, while the other three operate on the back. Both back and face are treated at one passage of the cloth. Each roller is adjusted from either side of the machine, thus regulating the action of the rollers on

the cloth to give the finish desired. The cloth is drawn over the emedy rollers by three iron press rollers set in the middle of the frame. The speed of the machine is adjusted by cone pulleys to give a speed of eleven, twelve or thirteen yards of cloth per minute. A hinged cover above the rollers prevents the escape of dust into the room. The dust passes through spiral grooves in the emery rollers and is collected in a hopper below.

The machine is provided with a strong cast iron frame joined by wrought iron rods. There is a cast iron smoothing drum and a brake roller to regulate the tension on the cloth. The machine is built in five widths varying from forty to eighty-four inches, and has proved its efficiency in a number of the leading woolen and worsted mills of Germany.

A STUDY ON THE COST OF POWER

For the purpose of determining whether purchased power or power generated at the plant would be cheaper, Lockwood, Greene & Co., the mill engineers, have made a very exhaustive survey of the situation with respect to a large cotton mill in Massachusetts. The plant consists of a 5-story spinning mill and a 2-story weave shed for making fine goods. The first installation contemplates 110,000 spindles and 2,500 looms, with provision for an ultimate extension to 170,000 spindles and 4,000 looms. Both the steam generating plant and the transformer sub-station for purchased power are assumed large enough to house the full equipment necessary for the ultimate size of plant.

The cost of power at the switchboard is taken in both cases. This board contains distributing switches for the mill circuits; and is located in the engine room of the steam power station, or in a small transformer building under constant charge of an attendant, if power is purchased. The amount and value of land required for the steam power house has not been estimated, it being assumed that space could be found upon the mill property. The cost of power for driving machinery alone is first considered, no account being taken of lighting, fire protection, heating or steam for manufacturing purposes. The last two items are considered separately.

The total horse power required to drive all the machinery in the mill was determined, with allowances made to cover losses in shafting, motors, etc., up to the switchboard. The total power at this point was found to be 4,191 h. p. or 3,143 k. w., assuming every machine running. With the normal conditions of operation, each machine would be idle about 10 per cent. of the time, so that the average lead on the power plant would be 3,772 h. p. or 2,829 k. w.

The first cost for steam generating plant, considering a building for 7,500 h. p. capacity and equipment for 5,000 h. p., would be $322,500, of which the engine room, boiler room, pump house, chimney, and coal pocket account for $85,000. The 35-ton electric traveling crane, together with an equipment of automatic sprinklers and miscellaneous items, brings the general equipment up to $5,000. The steam plant equipment, including seven boilers, two engines, one auxiliary engine, two condensers, two primary heaters, two feed pumps, one secondary heater, and the smoke flue, piping, covering, oiling system, and foundations is estimated at $152,000. The electrical equipment, including two 2,000 k. w. generators, two small generators, one small motor generator set and switchboard, station wiring, and cost of erection is figured at $51,200. Engineering and contingencies, 10 per cent. of the preceding totals, is $29,300, which makes the total first cost stated.

The total first cost for purchased power, estimating on a building of 6,000 k. w. capacity and equipment of 4,000 k. w., is $27,500. This includes building, $4,000; two 2,000 k. w. transformers (13,000 to 600 volts), high tension equipment and wiring, switchboard and erection expenses, $21,000. Engineering and contingencies is 10 per cent., or $2,500, making the total first cost as stated.

The operating cost in both cases includes capital charges: interest is figured at 6 per cent. upon the total first cost; taxes and in-

surance at 1 per cent. upon the net first cost, exclusive of engineering charges; depreciation at 2 per cent. upon building and 4 per cent. upon equipment; and maintenance at 1 per cent. upon net first cost. The time of operation is the same in both cases, including nine hours per day and 54 hours per week for 307 days in the year, thus allowing for 52 Sundays and 6 holidays. This makes 2,773 hours per year, which at 2,829 k. w. accounts for 7,816,427 k. w. hours in the year.

Under the heading of steam plant, the capital charges per annum amount to $35,242. The direct operating costs amount to $43,978; or a total of $79,220. Operation is figured upon 17.9 lbs. of water per k. w. hour (with a 10 per cent. waste in the feed pump), and 9 lbs. of water evaporated per pound of coal. This makes a total of 8,537 tons of coal per year, which with 20 per cent. added for nights, Sundays, and holidays, makes 10.244 tons. Using a mixture of 80 per cent. hard coal at $3.00 per ton, and 20 per cent. soft coal at $4.10, the unit cost of coal is $3.22. This makes the coal $32,985. Engine room labor, including chief engineer, assistant engineer, and one oiler, is $3,400. Boiler room labor, including three firemen, two coal passers, one night fireman, and one man Sundays and holidays, is $3,493, while waste and supplies, $4,100, complete the list.

Under purchased power capital charges are $3,070; sub-station attendant, $1,000, and power, at 1.34c. per k. w. hour (which was quoted by a power company in the neighborhood) amounts to $104,734, giving a total of $108,804.

Using the normal load factor of 90 per cent., the figures already given show that the cost per k. w. hour at the switchboard with the steam plant amounts to 1.014c., equivalent to $21 per h. p. year. The corresponding cost per k. w. hour with purchased power amounts to 1.39c. or $28.85 per h. p. year.

Taking account now of the fact that with the steam power plant steam would be available for slashing and for steam heating, while for purchased power this would have to be supplied separately, the difference in favor of the steam power plant becomes even more marked. The first cost has already been provided for in arranging for the steam power plant itself, while with the purchased power the cost of buildings and boilers would amount to $10,800. With the steam power plant, coal amounting to $10,450 and labor $350, makes a total of $10,800. With purchased power, coal for heating amounting to $11,750, together with labor and supplies $1,383, and capital charges $1,876, makes a total of $15,009, or an excess of $4,209.

We thus have the final annual costs as follows:

Steam power	$79,220	
Steam for heat and mfg.	10,800	
Total		$90,020
Purchased power	$108,804	
Steam for heat and mfg.	15,009	
Total		$123,813

In order to bring the two costs to the same figure, it would be necessary to obtain electric power at 0.985c. per k. w. hour. This is made clear by the following:

Annual cost of steam power	$79,220	
Excess cost of heating and mfg. when power is purchased	4,209	
Total		$83,429
Deduct cost of elec. pwr., aside from current		4,070
Net cost of current		79,359
Allowing 3 per cent. transformer loss		2,381
Final comparative cost elec. pwr.		$76,978

This figure divided by 7,816,429 k. w. hours gives the rate above quoted.

The foreign trade of the United States in silk and silk produces for the year 1909 consisted of: Exports of silk manufactures, $967,231; imports, raw silk in skeins, $74,060,605; waste, $1,451,796; manufactures, $32,707,982.

Personals

Harry Gaunt has accepted the position as superintendent of the Premier Worsted Mills, Bridgeton, R. I. He was formerly employed at Urbana, O., and succeeds Emmett Ainley.

J. A. Ring, overseer of finishing at the Lacon Woolen Mills, Lacon, Ill., has severed his connection with that company.

Joseph Bailey has accepted the position as overseer of the sewing department at the Coronet Worsted Co., Mapleville, R. I.

Albert Rhodes, overseer of dressing at the Hamilton Woolen Co., Amesbury, Mass., has resigned to accept a similar position at Norwich, Conn.

E. Talbot has accepted the position of overseer of weaving at the Enfield Mfg. Co., Enfield, Mass. He comes from Athol, Mass.

C. M. Powell, assistant superintendent of the Monticello Cotton Mills, Monticello, Ark., has resigned. He has been appointed superintendent of the Putnam Mills & Power Co., Eatonton, Ga.

Homer Grey, overseer of spinning at the Swift Spinning Mills, Columbus, Ga., has resigned to become second hand in No. 1 and 2 Spinning rooms at the Columbus Mfg. Co.

J. T. Jordan, superintendent of the Jefferson Cotton Mills, Jefferson, Ga., has resigned to accept a similar position with the Athens Mfg. Co., Athens, Ga.

James Oates has accepted the position of overseer of spinning at the Thomaston Cotton Mill, Thomaston, Ga. He was formerly employed at the Bibb Mfg. Co., Macon, Ga.

Neal McByrde, overseer of spinning at the Prattville Cotton Mills, Prattville, Ala., has resigned.

H. V. Deaver, overseer of carding at the Maple Mill, Dillon, S. C., has resigned.

M. L. Holt has accepted the position of overseer of carding at the Wilson Cotton Mills, Wilson, N. C.

J. B. Moore, formerly of Opelika, Ala., has accepted the position of superintendent of the Cleghorn Mill, Rutherfordton, N. C.

T. C. Goore has accepted the position as overseer of spinning at the Manchester Cotton Mill, Macon, Ga. He comes from Athens, Ga.

William McKinley has accepted the position as overseer of slashing for the Warwick Mills, Centreville, R. I. He was formerly employed at the Jenckes Spinning Co., Pawtucket, R. I.

Daniel Haddock, overseer of slashing at the Warwick Mills, Centreville, R. I., has resigned and was presented with a handsome Morris chair by the overseers with whom he had been associated.

John Lerpu has taken charge of the weaving department at the Danielson Cotton Co., Danielson, Conn. He was formerly employed at New Bedford, Mass.

P. J. Welch has accepted the position as overseer of carding at the Bay State Mills, American Woolen Co., Lowell, Mass.

R. C. Simpson, designer at the Monaghan Mills, Greenville, S. C., has resigned to accept a position as overseer of weaving at the Fairmont Mills, Fairmont, S. C.

B. P. Howe has accepted the position of overseer of spinning at the Warren Mfg. Co., Warrenville, S. C.

T. C. Gore, superintendent of the Athens Mfg. Co., Athens, Ga., has severed his connection with that company.

W. D. Neal, overseer of carding and spinning on the night shift at the Rhode Island Mills, Spray, N. C., has resigned.

Michael Berry has been appointed overseer of dyeing at the Tillotson Mfg. Co., Pittsfield, Mass. He held the position of second hand for a number of years.

William P. Vaughn has been appointed superintendent of the Uncasville Mfg. Co., Uncasville, Conn. He was formerly overseer of carding at the Ashland Mills, Jewett City, Conn.

Albert Bilson, overseer of wet finishing at the Assabet Mill, American Woolen Co., Maynard, Mass., has resigned his position at that mill.

Joseph Sykes, superintendent of the Lawrence, Webster Co., Malone, N. Y., has resigned and is succeeded by Thomas Rawlev.

Philip H. Manning, overseer of carding at the Jefferson Mfg. Co., Jefferson, Mass., has severed his connection with that company.

John Weachman has accepted the position of second hand in the spinning department at the Pontoosuc Woolen Mfg. Co., Pittsfield, Mass., succeeding James Morrison.

Sydney R. David was temporarily in charge of the dyeing at the Peacedale Mfg. Co., Peacedale, R. I., for two weeks in August while the dyer, Leonard Hinchcliff, was on a vacation. Mr. David is connected with the F. E. Atteaux Co., of Boston, Mass.

Charles A. Morrison, bookkeeper at the Bristol Mill, New Bedford, Mass., has been appointed treasurer succeeding George C. Hinckley.

Louis Lafrance has been appointed overseer of spinning at the Fall River Iron Works Co., No. 5 Mill, Fall River, Mass., succeeding W. H. Gordon.

Frederick W Allen, overseer of weaving for Waterhouse & Howard, North Adams, Mass., has severed his connection with that company.

George K. Tate has been appointed superintendent of the Atlantic & Gulf Mills, Quitman, Ga.

E. E. Smith, superintendent of the Marlboro Mill, No. 4, McColl, S. C., has resigned to accept the position of overseer of spinning at the Highland Park Mill, No. 3, Charlotte, N. C.

W. E. Biggs has been promoted from overseer of carding to the position of superintendent of the Cox Mill, Anderson, S. C.

R. L. Cumnock, Jr., superintendent of the Cox Mill, Anderson, S. C., has resigned.

W. H. Sanders, formerly of Lando, S. C., has accepted the position of overseer of spinning at the Wylie Mills, Chester, S. C.

C. Enos Bean, superintendent of the Atlantic & Gulf Mills, Quitman, Ga., has resigned. He has been appointed manager of the J. Frederic Houston Mill, Cumberland, N. C.

E. W. Edwards, superintendent of the Patterson Mills, China Grove, N. C., has resigned.

J. W. McBryde has accepted the position as overseer of carding at the Panola Mill, Batesville, Miss. He comes from Prattville, Ala.

Joseph Castleberry has accepted the position of overseer of carding at the Ensign Cotton Mills, Forsyth, Ga.

L. N. Hamrick, overseer of the winding and twisting at the No. 2 Bibb Mill, Macon, Ga., has resigned to accept a position with the Payne Mills, of the same place.

R. A. Burris, superintendent of the Manetta Mills, Lando, S. C., has resigned and will return to his former position as superintendent of the reorganized Royal Mill, Charleston, S. C.

C. A. Davis, overseer of carding at the Manetta Mills, Lando, S. C., has resigned.

James J. Burns, overseer of finishing at the Narragansett Worsted Co., Oxford, Mass., has secured the position of overseer of finishing at the Central Worsted Co., Central Village, Conn.

George S. Collins has been appointed superintendent of the Cutler Mfg. Co., Warren, R. I. He comes from Danielson, Conn.

William S. Nason has accepted the position of overseer of finishing for Charles A. Stevens & Co., Ware, Mass. He comes from North Billerica, Mass.

J. A. Ring, overseer of finishing at the Lacon Woolen Mills, Lacon, Ill., has resigned to accept a similar position with the Hanover Woolen Mfg. Co., Hanover, Ill.

Frederick W. Allen has been appointed overseer of weaving at the Granite Mills, A. L. Sayles & Sons, Pascoag, R. I. He was formerly engaged with the Waterhouse & Howard Mill, North Adams, Mass.

John J. Henderson, superintendent of the Cordaville Blanket Co., Cordaville, Mass., has severed his connection with that company to accept the position of agent of the Royalston Mill, American Woolen Co., South Royalston, Mass. Mr. Henderson was superintendent at Cordaville, Mass., for fourteen years.

Henry W. Schoenfield, overseer of carding at the Columbia Mills, Lewiston, Me., has severed his connection with that company.

Bernard Merriman, assistant superintendent of the Cordaville Blanket Co., Cordaville, Mass., has succeeded John J. Henderson as superintendent.

D. J. Dooley, overseer of dyeing at the Gilsum Woolen Co., Gilsum, N. H., has severed his connection with that company.

Joseph Shaughnessey, overseer of finishing at the Wesserunsett Worsted Co., Skowhegan, Me., has severed his connection with that company.

R. V. Clogstain has succeeded A. P. Taylor as superintendent of the Farwell Bleachery, Lawrence, Mass. He comes from North Adams, Mass.

Wallace B. Coates has succeeded A. C. Freeman as agent of the Farwell Bleachery, Lawrence, Mass.

Edmund P. Dickinson, overseer of dyeing at the Glazier Mfg. Co., South Glastonbury, Conn., has severed his connection with that company.

Leo Gottlied has accepted the position as designer at the Globe Woolen Co., Utica, N. Y. He was formerly employed as designer at the Princeton Worsted Co., Trenton, N. J., and previously to that time was with the Prudential Worsted Co. of Philadelphia.

Herbert Massey has accepted the position as overseer of dyeing at the Glazier Mfg. Co., South Glastonbury, Conn. He was formerly employed at the Narragansett Worsted Co., North Oxford, Mass.

Stanley J. Wrubel has accepted the position of overseer of scouring and carding on the night shift at the Hudson Worsted Co., Hudson, Mass.

Joe Wood, overseer of weaving for A. L. Sayles & Sons, Pascoag, R. I., has resigned to accept a similar position with Waterhouse & Howard, North Adams, Mass.

J. J. Dougherty has accepted the position as overseer of dyeing and finishing for Jacob Miller Sons & Co., Bourich Mill, 16th and Reed Sts., Philadelphia, Pa.

Leo Shindler and Miss Lizzie Gilthorpe were married on Monday, September 2, at Staffordville, Conn. Mr. Shindler is overseer of weaving at the Garland Woolen Co. of that place. He was presented with a handsome bookcase by the overseers at the Garland Woolen Co. They have gone on their honeymoon to Providence and Boston and will take up their home at Staffordville on their return.

George A. Judson, overseer of the finishing department at the Talbot Mill, North Billerica, Mass., has severed his connection with that company.

Samuel J. Monette, second hand in the weaving department for the New England Mills, Rockville, Conn., has resigned to accept the position of overseer of weaving at the Mystic Mfg. Co., Mystic, Conn. He had been second hand at the New England Co. for the past twenty-eight years.

John Kirkland, overseer of carding at the Barnard Mfg. Co., Fall River, Mass., for the past twenty-two years, has retired from active service. On behalf of the help who had been working under him he was presented with a beautiful gas lamp, silk umbrella and a box of cigars.

M. H. McEvoy has accepted the position of overseer of dyeing at the Great Falls Woolen Co., Somersworth, N. H. He comes from Worcester, Mass.

Thomas E. Foley, overseer of spinning at the Faulkner Mfg. Co., North Billerica, Mass., has resigned and is succeeded by Edward Bromley, from Collinsville, Mass.

James Dunsmore has accepted the position of overseer of finishing at the Lacon Woolen Mills, Lacon, Ill. He comes from Preston, Canada.

C. C. Clark has been appointed superintendent of the Harden Mfg. Co., Worth, N. C. He comes from Blacksburg, S. C.

W. P. Hurt has been appointed superintendent of the Barringer Mfg. Co., Rockwell, N. C. He comes from China Grove, N. C.

R. R. Woodwide has accepted the position as overseer of weaving at the Westervelt Mills, Greenville, S. C. He comes from Greer, S. C.

E. W. Edwards has been appointed superintendent of the Monroe Cotton Mills, Monroe, N. C. He comes from China Grove, N. C.

S. H. Howard, superintendent of the Harden Mfg. Co., Worth, N. C., has resigned.

M. T. Sandford has accepted the position as overseer of the No. 3 and 4, carding and spinning at the Holt-Granite Mills, Haw River, N. C. He comes from Quitman, Ga.

J. A. Norris has accepted the position of overseer of spinning at the Easley Cotton Mills, Easley, S. C. He comes from Atlanta, Ga.

W. L. Truesdell has been appointed superintendent of the Manetta Mills, Lando, S. C., succeeding R. A. Willis.

C. M. McFall has been appointed night superintendent at the Belmont Mill, Shelby, N. C. He was formerly employed at the Anna Mill, King's Mountain, N. C.

Arthur Colman, overseer of carding at the Sevier Mill, King's Mountain, N. C., has resigned.

L. O. Bunton has been promoted from overseer of the cloth room to overseer of weaving at the Wylie Mill, Chester, S. C.

E. E. Bowen has accepted the position of overseer of weaving at the Victor Mfg. Co., Greer, S. C. He formerly held a similar position at the Wylie Mills, Chester, S. C.

J. P. Hartsoe has been appointed superintendent of the Shaw Cotton Mill at Weldon, N. C., in connection with the Weldon Cotton Mfg. Co.

A. O. Norris has accepted the position as overseer of carding at the Eureka Mill, Chester, S. C. He comes from Gibsonville, N. C.

James Shaw has accepted the position of section hand in worsted drawing at the Star Worsted Co., Fitchburg, Mass.

Heywood Ramsden, overseer of finishing at the Ottaquechee Woolen Co., Evarts, Vt., has resigned.

At a meeting of the directors William H. Jennings was elected president of the Wampanoag Mill, Fall River, Mass., to succeed the late George H. Eddy. Melville B. Horton was elected to the board of directors.

John J. Macready has accepted the position of designer at the Yantic Woolen Co., Yantic, Conn. He comes from Philadelphia, Pa.

F. H. Doyle, designer at the Yantic Woolen Co., Yantic, Conn., has severed his connection with that company.

C. S. Lord has accepted the position of overseer of finishing at the Ottaquechee Woolen Co., Evarts, Vt. He comes from Bridgton, Me.

John E. Kelly, who recently accepted the position of overseer of finishing at the Talbot Mills, North Billerica, Mass., has severed his connection with that company. He was formerly employed at the Rock Mfg. Co., Rockville, Conn.

Thomas F. Moore, son of George W. Moore of the George W. Moore Co., Worcester, Mass., will have charge of their branch mill at Westerly, R. I., which will be in operation in a very short time.

Ryan Rosendale, who recently severed his connection with the Wayne Dye Works, has accepted the position of superintendent for Altschuler Bros., Paterson, N. J.

Louis Foley, overseer of the tentering department at the Clyde Print Works, Clyde, R. I., has resigned and is succeeded by Edward Mason, formerly with the Garner Print Works & Bleachery, Wappinger's Falls, N. Y.

George H. Asquith, Jr., overseer of carding at the Hanover Woolen Mfg. Co., Hanover, Ill., has severed his connection with that company.

John Drysdale, for the past thirty-two years overseer of dressing at the North Adams Mfg. Co., North Adams, Mass., has resigned. He was presented with a traveling bag by the help in that department.

James Bolger has been appointed overseer of dressing at the North Adams Mfg. Co., North Adams, Mass.

M. J. O'Malley, overseer of dyeing for the John C. Meyer & Co., Middlesex St., Lowell, Mass., has severed his connection with that company. Mr. O'Malley has been boss dyer with this company for several years. His son succeeds him as overseer at this mill.

Alfred Thackrah, Jr., has been appointed manager of the Enterprise Worsted Mills, Millville, Pa. He is a graduate of the Philadelphia Textile School.

Eugene Rivetti, overseer of weaving at the Susquehanna Silk Mills, Sunbury, Pa., has been transferred to their mill at Milton, Pa. This is an indication that his work has been very satisfactory while with this company.

George C. Hinckley, treasurer of the Bristol Mfg. Co., New Bedford, Mass., has severed his connection with that company. Charles A. Morrison is filling the position temporarily.

Frank Judson, overseer of finishing at the Yantic Woolen Co., Yantic, Conn., has severed his connection with that company.

Edmond J. Doucette has accepted the position of second-hand in the worsted spinning department at the Pacific Mills, Lawrence, Mass.

Thomas Somerville has been appointed overseer of finishing at the Wesserunsett Worsted Co., Skowhegan, Me., succeeding Joseph Shaughnessy.

William Teal, who has been employed at the Rhode Island Worsted Co., Stafford Springs, Conn., for a number of years, has been transferred to the Victor Mills, Clinton, Mass., to take charge of weaving.

Martin Harding has accepted the position as overseer of carding at the Faulkner Mfg. Co., North Billerica, Mass. He comes from the Merrimac Woolen Co., Dracut, Mass.

Albert Rhodes has accepted the position as superintendent and designer at the Tremont Worsted Co., Methuen, Mass. He was formerly employed at the Sheriffs Worsted Co., Fitchburg, Mass.

W. L. Lowry, manager and superintendent of the Monroe Cotton Mills, Monroe, N. C., has resigned to accept the position of purchasing agent of the New York Mills, Oneida Co., New York.

W. E. Fearrington has been appointed superintendent of the Edenton Cotton Mills, Edenton, N. C., having resigned a similar position with the Elizabeth City Cotton Mills, Elizabeth City, N. C.

J. W. McAlpine has accepted a position as overseer of spinning at the Milfort Mills, Fort Mill, S. C., having resigned a similar position with the Monarch Mills, Dallas, N. C.

F. C. Rollins, overseer of night carding and spinning at the Ella Mills, Shelby, N. C., has resigned to accept a similar position with the Cleghorn Mills, Rutherfordton, N. C.

W. A. Black has been appointed superintendent of the Beaumont Mills, Spartanburg, S. C. He formerly held a similar position with the Granby Mills, Columbia, S. C.

S. P. McLester has accepted the position of overseer of spinning at the Kinston Cotton Mill, Kinston, N. C. He comes from Goldsboro, N. C.

E. N. Tart has accepted the position of bookkeeper and assistant superintendent of the Kinston Cotton Mill, Kinston, N. C. He formerly held the position of overseer of carding and spinning at the Holt Williamson Mfg. Co., Fayetteville, N. C.

Charles F. Foster has been promoted from overseer of dyeing to superintendent of the Aurora Cotton Mill, Burlington, N. C.

George Louis, superintendent of the North Adams Mfg. Co., North Adams, Mass., has resigned. James Waterhouse, formerly of Waterhouse & Howard, is his successor.

C. F. Waterman, agent, and P. L. Waterman, superintendent of the French River Textile Co., Mechanicsville, Conn., have resigned. It is also stated that R. I. Illi, designer, and W. A. Prazdale, master mechanic at this mill, have resigned. It is reported that J. B. Hanscom of Woonsocket, R. I., has taken the position of agent of this mill and W. M. Corcoran of Rockville, Conn., has been appointed superintendent.

C. W. Dennett, general manager of the Hadley Mill, South Hadley Falls, Mass., H. I. Dennett, superintendent and Winfield S. Dennett, overseer of the cotton finishing department, have severed their connections with this company. It is reported that Joseph P. Lankes has been appointed acting superintendent.

W. F. Campbell has accepted the position as overseer of carding and spinning at the Lakeside Mills, Burlington, N. C.

J. W. McClure has been appointed superintendent of the Magnolia Mills, Charlotte, N. C.

J. B. Meacham, overseer of finishing in the knitting department of the Wiscassett Mills, Albemarle, N. C., as resigned.

J. F. Lockey has been appointed superintendent of the Athens Mfg. Co., Athens, Ga. He was formerly employed in a similar position at the Dickson Mill, Laurinburg, N. C.

R. H. Banks has accepted the position as night overseer of spinning at the Henderson Cotton Mills, Henderson, N. C. He was formerly employed at the Shaw Cotton Mill, Weldon, N. C.

W. F. Rawl has accepted the position as overseer of weaving, warping and slashing at the Orangeburg Mfg. Co., Orangeburg, S. C. He comes from Batesburg, S. C.

A. A. Short has accepted the position of overseer of carding and spinning at the Paola Mills, Statesville, N. C. He was formerly employed at Bessemer City, N. C.

H. P. Lovell has been appointed superintendent of the Rhode Island Worsted Co.s plant at Clinton, Mass.

Harry M. Turner, superintendent of the Crystal Spring Bleaching & Dyeing Co., Assonet, Mass., for the past ten years, has severed his connection with that company.

C. C. Clark has been appointed superintendent of the Harden Mfg. Co., Worth, N. C. He was formerly superintendent of the Whitaker Cotton Mill, Blacksburg, S. C.

Louis C. Werner, superintendent of the Woodland Worsted Mills, Cedar Brook, N. J., has severed his connection with that company.

William Tedd has accepted the position of second hand of weaving at the Uxbridge Worsted Co., Uxbridge, Mass. He was formerly employed at the Enfield Mfg. Co., Enfield, Mass.

Aaron Jewell, superintendent of the Rochester Woolen Co., Rochester, N. H., has severed his connection with that company.

William Hood has accepted the position of second hand of carding at the West Boylston Mfg. Co., Eastampton, Mass.

John Collier, superintendent and designer of the Cocheco Woolen Mfg. Co., East Rochester, N. H., has resigned to accept the position of superintendent of the Crawford Woolen Co., Martinsburg, W. Va.

Thomas Sampson, agent of the Ounegan Mill, American Woolen Co., Old Town, Me., has been transferred to the Forest Mill, Bridgton, Me., of the same company.

William Deacon, Jr., assistant superintendent of the Kennebec Mill, American Woolen Co., Fairfield, Me., has been appointed superintendent of the Forest Mill, Bridgton, Me.

William H. Cummings has been appointed agent of the Ounegan Mill, American Woolen Co., Old Town, Me.

Norman S. Russell has accepted the position of overseer of spinning at the Springfield Blanket Co., Holyoke, Mass. He was formerly employed at the Brickner Woolen Mills, Sheboygan Falls, Wis.

N. J. James has accepted the position of overseer of carding and spinning at the Wallace Mills, Jonesville, S. C.

Clifford E. Foster, assistant superintendent of Cheney Bros., silk manufacturers, South Manchester, Conn., has resigned. He is succeeded by Herbert Ingham.

William L. Woodward, overseer of carding at the Smith Woolen Co., Pittsfield, Me., has resigned to accept a similar position with the Merrimack Woolen Co., Lowell, Mass.

Emil Kisro has been appointed overseer of finishing at the Talbot Mill, No. Billerica, Mass. He was formerly engaged for a number of years with S. Slater & Sons, Webster, Mass.

DEATHS.

William Corey, manufacturer of latch needles for knitting machines, died suddenly at Manchester, N. H. Mr. Corey was born in Stanbridge, P. Q., Canada, January 31, 1841 and was educated in the public schools. In 1866 he began manufacturing knitting machine needles. He served as alderman for two years and later was a member of the Board of Water Commissioners. He was a director of the Manchester First National Bank and was a thirty-second degree Mason. He was also a Shriner. Mr. Corey is survived by a wife. The cause of his death was given as acute indigestion.

Ebenezer Gould died at his home in East Dedham, Mass., at the age of 86 years. Mr. Gould had been master mechanic for the Merchants Woolen Co., East Dedham, for over fifty years and retired from active service some eighteen years ago. He is survived by a widow, one daughter and two sons.

Charles E. Richards, the senior partner of the firm of Richards, Atkinson & Haserick of Boston and Bradford, Eng., died at his home at Harrowgate, Eng., on September 1st. Mr. Richards resided in England, having charge of the business in that country and only visited this country occasionally. The firm are large importers of textile machinery, especially worsted machinery. Some years ago the name of the firm was changed from Stoddard, Haserick & Richards to its present style.

Major Enos Resser Artman, a wealthy carpet manufacturer and prominent civil war veteran, died at the Canyon Hotel, Yellowstone Park, having been stricken while on his way to California with his wife. Complication of diseases was the cause of his death. He was president of the Putnam Mills Carpet Co. of Second and Huntington Sts., Philadelphia, Pa. He was also a member of the Pennsylvania Commandery, military order of loyal legion. A widow survives him.

Eugene A. Wheelock, treasurer of the Putnam Woolen Co., Putnam, Conn., died at his home in Putnam on Saturday, September 14. He was born at Uxbridge, Mass., on Feb. 15, 1845, and at the age of 17 he entered the employ of the Calumet Woolen Co. of Uxbridge, his father being treasurer of that mill. In 1867 he was put in charge of the woolen mill at Wilsonville and later was made agent and superintendent of the Putnam Woolen Co. Mr. Wheelock is survived by a widow and five children.

George H. Eddy, a prominent cotton manufacturer of Fall River, Mass., died at the age of 83 years. Mr. Eddy was treasurer of the Flint Mills for a number of years. He resigned that position in 1880 to enter the cotton brokerage business. He later was president of the Weetamoe Corporation, also the Wampanoag Mill. He was elected a member of the House of Representatives in 1872 and is survived by a widow and three sons.

David H. Mudgett, treasurer of the Wassookeag Woolen Co., Dexter, Me., was buried from his home in Dexter on Monday, September 9. He was a member of the Dexter Club and the Bedivere Lodge, K. of P. During the services the woolen mills of Dexter were closed out of respect for Mr. Mudgett.

Robinson Walmsley, for forty years superintendent of the Tecumseh Mill, Fall River, Mass., was found dead at his home on Lincoln Ave. Death was the result of acute kidney disease. Mr. Walmsley was 80 years of age and is survived by a wife, one daughter and two sons.

Mill News

Those interested in receiving early and more complete investigated information of projected new mills, enlargements, improvements, fires, facts and gossip of the trade are referred to the TEXTILE ADVANCE NEWS, issued weekly by the publishers of the TEXTILE WORLD RECORD, at $15.00 per year. Communications for this department are invited. There is no charge made for printing notices of new mills, enlargements, improvements, etc.

COTTON.

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New Mills.

*Alabama, Sylacauga. - The projected cotton mill headed by B. B. Comer of the Avondale Mills will be a branch of the Avondale Mills of Birmingham, and not a separate new company as all reports indicated. Construction work is to be started promptly with a view to having everything in readiness for the beginning of manufacturing about May 1, 1913. Grey cloths will be the whole output at first. The new mill will have 30,000 to 40,000 ring spindles and 800 to 1,000 automatic looms, giving employment to about 500 hands.

*Georgia, Dalton. Plans for the new cotton mill to be located at Phelps are being given consideration by F. T. Hardwick, treasurer of the Crown Cotton Mills of Dalton, and his associates It has been noted that 330 acres of land and water rights have been purchased.

*North Carolina, Gastonia. The directors of the new Armstrong Cotton Mills Co., for which a mill is now under construction, hope to be in operation by the middle of November or by December 1 at the latest. 3,000 spindles and preparatory equipment will be installed to make 4s to 14s combed yarns. Electric power equipment will be installed.

North Carolina, High Point. The High Point Hosiery Mills, Inc., manufacturers of men's and women's seamless and children's and misses' hosiery, will build a 10,000 spindle hosiery yarn mill to manufacture yarns for their own use, the location of which, however, has not been decided upon. This is the project wihch has been incorrectly reported as to locate at Trinity. The company, of which J. H. Mills is president and J. H. Adams, treasurer and buyer, has a capital and surplus of $175,000 and an equipment of 450 latch needle knitting machines and 24 sewing machines.

*North Carolina, Rhodhiss. Good progress is being made by the contractor on the buildings for the E. A. Smith Mfg. Co. Some of the machinery contracts have been placed. It is expected manufacturing will be started in February.

*South Carolina, Kershaw. Material is arriving and actual construction work will soon be started on the new mill for the recently organized company to be known as the Kershaw Cotton Mill. details of which have appeared in previous issues.

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Enlargements and Improvements.

Alabama, Eufaula. Repairs and improvements at the Cowikee Mills include the installation of a rope drive power transmission system to replace the old power shaft equipment. This company was recently reported as installing 8,000 additional spindles.

Alabama, Jacksonville. Extensive improvements are being made by the Ide Cotton Mills which include replacing the old wooden warehouses with concrete structures.

Canada, Quebec, Magog. Work has been started on the construction of a new weave shed at the local plant of the Dominion Textile Co., Ltd., which is to house an installation of 500 new automatic looms, this equipment having already been ordered. The building it is expected will be completed by Nov. 1.

*Connecticut, Killingly. Before the end of this month work will be started on the new weave shed, 210 by 200 ft., for the Killingly Mfg. Co., construction contract having been let. The building will be 2 stories high and will have a sawtooth roof.

Connecticut, North Grosvenordale. The Grosvenordale Co. is installing a large number of intermediate, roving and jack frames, also revolving flat cards, from the H & B American Machine Co., Pawtucket, R. I.

*Connecticut, Taftville. Some new carding and spinning equipment is being installed in the Ponemah Mills. Reports that another story would be built on No. 2 Mill are incorrect.

*Georgia, Atlanta. Rearrangement of equipment in the plant of the Exposition Cotton Mills is going forward and new machinery to replace old machines is being received. Cards, drawing frames, speeders and spinning frames are being supplied by the H & B American Machine Co., Pawtucket, R. I.

*Georgia, Atlanta. About $15,000 will be expended by the Fulton Bag & Cotton Mills in overhauling and improving the spinning department of No. 1 Mill. All the supplies necessary have been bought. Bonds were issued recently to cover large improvements in the various departments of this concern.

*Georgia, Chickamauga. President D. A. Jewell of the Crystal Springs Bleaching Co. reports that plans are not yet perfected for the new weaving mill to be built by that concern. Details are promised for these columns as soon as plans are completed.

Georgia, Columbus. An increase is to be made by the Hamburger Cotton Mills, including 1,000 spinning spindles and new drying equipment for cloth.

*Georgia, Columbus. Looms are being installed in the new weaving department of the Bibb Mfg. Co. Humidifying apparatus is being put in place, and that in the main mill of the company is being replaced with a modern system.

*Georgia, Columbus. Repeated rumors from Columbus to the effect that the Meritas Mills would be greatly enlarged, which were as often denied at the New York office, have finally been confirmed. The company has definitely decided to increase the mill to 25,000 spindles with additional looms to take care of this extension. The original equipment was about 11,000 spindles and 200 looms. When extended, the equipment will be about 25,000 spindles and 500 looms and will be installed for the manufacture of drills. J. T. Broadbent is the agent and is located at the New York office, 320 Broadway, which is also the office of the Standard Oil Cloth Co.

Georgia, Columbus. Three thousand spindles are being added by the Swift Spinning Mills and will give them 15,768 producing spindles. The installation of 10,000 more spindles is being given consideration. 8s to 12s yarns on cones, tubes and skeins, both single and twisted are manufactured.

*Georgia, Eatonton. Enlargements at the plant of the Imperial Cotton Mills, work upon which has been started, will double the capacity, and will also include the erection of 17 additional tenement houses on the property.

Georgia, Forsyth. Contract has been awarded by the Ensign Cotton Mill for 32 new cards to replace all the cards now in operation. Recently this company installed new pickers.

*Georgia, Greensboro. Plans for the new weave shed of the Mary Leila Cotton Mill have been prepared by Edward Sohle of Charlotte, and call for a building, 225 by 100 ft. Bids for the construction work are being invited and it is probable operations will start in a few weeks. 6,000 spindles and 150 looms will be added.

*Georgia, Trion. The property of the bankrupt Trion Mfg. Co. has been transferred to the Trion Co., incorporated a few weeks ago with capital stock of $900,000 to take over and operate the mills. Several hundred thousand dollars will be expended to enlarge and improve the mill property and village, it being estimated that the changes for village improvements will cost about $100,000 and enlargements and improvements in the plant about $300,000. B. D. Riegel of New York, head of the Riegel Sack Mfg. Co. of Jersey City, and treasurer of the Ware Shoals Mfg. Co., at Ware Shoals, S. C., is president and treasurer. Thos. G. Beal is vice-president; C. B. Caperton of Rome, Ga., is secretary and assistant treasurer, and Edward Lovering, Boston, is one of the directors. Mr. Caperton was connected with the Massachusetts Mills in Georgia, at Lindale, of which Mr. Lovering is treasurer, for several years.

Kentucky, Maysville. January & Wood Co., proprietors of the Maysville Cotton Mills, will shut down for three weeks to overhaul the buildings and make repairs. Cotton yarns, twines and lines are manufactured.

*Maryland, Baltimore. The Consolidated Cotton Duck Co. has awarded contract for the construction of a 5-story warehouse at the Mt. Vernon Mills to be of reinforced concrete, 332 by 60 ft. Lockwood, Greene & Co., Boston, drew the plans. It has been reported previously that this new building would be an addition to No. L Mill, but will be used for warehouse purposes.

Massachusetts, Fisherville. A number of fans have been installed by the Fisher Mfg. Co. to remove escaping steam.

*Massachusetts, Lowell. The new 5-story mill for the Appleton Co., in which work was started in May, is fast nearing completion, the masons being up to the third story. The building is 242 ft. long and about 100 ft. wide. The first floor will be occupied by the repair shop and the basement will be used as supply room. The other floors will be used for manufacturing purposes and somewhere in the vicinity of 700 looms are to be installed. When this building is completed a rearrangement of the plant is contemplated which will bring every department into a more compact form and give a higher efficiency. It will be operated and lighted by electricity from the new power station.

Massachusetts, Southbridge. A $30,000 storehouse is to be built for the Central Mills Co. at the corner of Foster and North Sts. The building will be 120 by 60 ft., 3 stories high, of brick and reinforced cement construction and will be used for storing raw cotton and finished goods. This structure will take the place of the present storehouse which has been purchased by the railroad company for the purpose of erecting a station on the site.

Massachusetts, West Warren. A new weave shed is to be erected by the Warren Cotton Mills of the Thorndike Co. and houses on the site to be occupied by the new building have been removed. A new water system also is to be installed in the mill. Recently a new cloth room and a new repair department were built. Walter B. Hall is agent.

New Hampshire, Manchester. It is reported that the Stark Mills of the International Cotton Mills Corp., which have up to the present time had their dyeing done by outside concerns, have started work on the erection of a dye house, and will also build a large addition to the No. 1 Mill, practically a new mill for spinning and weaving. The annual shutdown this year will be for a very short period, only from Wednesday night of this week until Tuesday morning.

North Carolina, Chapel Hill. New machinery equipment is being installed by the T. F. Lloyd Mfg. Co., which will bring the capacity up to the point for which the mill was planned.

*North Carolina, Franklinton. The Sterling Cotton Mills will build a new 2-story mill, 280 by 140 ft. It was reported in August that 10,000 spinning and 1,600 twisting spindles would be installed.

North Carolina, Gastonia. Some changes and improvements will be made by the Flint Mfg. Co. and include the building of a 1-story addition, 30 by 55 ft., to be used for warping and the installation of 1,000 new spindles, 2 combers, 2 speeders and other preparatory equipment. All contracts have been awarded.

*North Carolina, Marion. The new mill being erected for the Marion Mfg. Co. will be 4 stories high, 154 by 132 ft., and will cost about $60,000. When it is completed they will have space for additional equipment, including 22,500 spindles and 550 looms, but as noted in May, all the new manufacturing space will not be wholly filled up at present. Contract has been awarded.

*North Carolina, Monroe. An addition will be built to the Monroe Cotton Mills at once and 4,968 spindles and 60 looms added to the equipment. Sheetings are manufactured. It is expected the new machinery will be running before the end of October. B. D. Heath is president; W. C. Heath, treasurer, and E. W. Edwards, superintendent and buyer.

North Carolina, Mt. Holly. An installation of 1,700 new spindles has been made in the plant of the Nims Mfg. Co.

North Carolina, Mountain Island. The Armon Mfg. Co. has installed 1,600 additional spindles, a banding machine, one twister and two winders.

North Carolina, Randleman. A new dye house will be built by the Deep River Mills to replace the building recently destroyed by fire with loss of about $7,500. The new building will be of brick construction, 80 by 40 ft., 2 stories high, and will be equipped for dyeing raw stock, extracting and drying. It will be completed in 60 days.

*North Carolina, Roanoke Rapids. The Rosemary Mfg. Co. has awarded construction contract to T. C. Thompson & Bros. of Charlotte, for additions as follows: 2-story spinning mill, 190 by 160 ft.; weaving mill, 1 story and basement, 160 by 348 ft., with saw-tooth roof; picker building, 107 by 47 ft., all to be of regular mill construction. As noted, J. E. Sirrine, Greenville, prepared the plans for the enlargements which will give an increase of 22,000 spindles and 500 Jacquard looms for making cotton damask. Each loom is to be driven by a motor. A 2,000 k. w. steam and electric power house is being built at the present time.

*North Carolina, Salisbury. The mill for the Princeton Cotton Mills Co., incorporated in April, is nearly completed. It is 56 by 96 ft., with an ell, 25 by 50 ft., of brick and concrete construction. The company is installing 20 68-inch looms and 16 78-inch looms, driven by electric power, to make table damasks. Later it is planned to install a spinning department and make all the yarns used. The equipment formerly operated by the Grace Mills was purchased. M. L. Jackson is president and T. B. Marsh, secretary and treasurer.

North Carolina, Statesville. The matter of doubling the capacity of the Paola Cotton Mills, manufacturers of 20s to 30s yarns on 5,300 spindles, is being given consideration by the directors, but they have not definitely decided on the enlargement.

Pennsylvania, Philadelphia. It is reported that the John Mawson Hair Cloth Co., manufacturers of hair cloth, flannels and serge linings on 212 looms at Kensington Ave. and Venango St., is arranging for the repairing and rebuilding of that portion of the building formerly occupied by Herbert B. Newton and which was recently destroyed by fire. As soon as the building is put in condition, additional machinery will be installed for the purpose of enlarging their present plant.

Pennsylvania, Philadelphia. The National Hair Cloth Co., which equipped a plant at Front St. and Lehigh Ave. last spring with 40 looms, are reported running on full time and are also adding ten more looms to their equipment.

Pennsylvania, Philadelphia. It is reported that C. J. Milne & Sons, manufacturers of cotton shirtings, cheviots and novelties at 11th and Washington Ave., where they operate 377 looms, are about to install a plant for the dyeing and finishing of their product. They sell through New York and other large cities.

*Rhode Island, Lonsdale. It is estimated that about two months will be required to rebuild the ell of No. 4 Mill of the Lonsdale Co., containing the slasher and picker room equipment, which fell into the Blackstone River last week.

*Rhode Island, Pawtucket. Equipment is being received for the extensive addition to the plant of the Greene & Daniels Co., Inc., including opening and picking machinery, cards and speeders from the H & B American Machine Co., Pawtucket, and combers from the Whitin Machine Works, Whitinsville, Mass.

*South Carolina, Anderson. Contract has been awarded by the Toxaway Mills for 30 additional operatives' cottages. As noted previously, an addition to the plant is under way which will provide for an increase of 12,000 spindles and 300 looms.

South Carolina, Fort Mill. Work on a new two-story cotton warehouse for the Fort Mill Mfg. Co., to be located in the rear of the mill building, will soon be commenced.

*South Carolina, Greenville. John T. Woodside, president of the Woodside Cotton Mills Co., has announced that practically half a million dollars will be spent in enlarging and increasing the Woodside Cotton Mills. 27,000 spindles and 626 looms are to be added, making a total of 112,000 spindles and 2,650 looms on print cloth. The capital stock will be increased from $1,200,000 to $1,750,000.

South Carolina, Seneca. A new picker room is being built by the Seneca Cotton Mills of the Parker Cotton Mills Co., which will be 55 by 55 ft. New machinery equipment is to be installed which will include 36 looms, 10 cards, drawing frames and roving machinery. It was reported in the spring that extensive improvements were planned for the Seneca plant and the equipment increased from 20,000 spindles and 450 looms to 30,000 spindles and 1,000 looms, also new engine and boilers to give increased power.

*Texas, Cuero. The Guadalupe Valley Cotton Mills have awarded contract to Chas. Fuess for the construction of a new warehouse and addition to the mill building, which as noted recently, was voted by the directors.

*Texas, McKinney. Jones & Cooper, contractors of this city, have the contract for the construction of additions for the Texas Cotton Mill Co. The contract price is in the neighborhood of $22,000. It has been noted that about $40,000 is to be expended this fall to increase the production of denims, awning stripes and similar goods.

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Mills Starting Up.

Arkansas, Helena. Preparations are being made to start the Premier Cotton Mills which have been idle for some time. The old management will be in charge.

*Connecticut, Putnam. It is believed that by Oct. 1, the plant of the Manhansett Mfg. Co. will be running in full. About 60 hands are at work now in the tire fabric department.

*Massachusetts, Adams. The mills of the Berkshire Cotton Mfg. Co. resumed operations this week after a three weeks' shut down on account of a strike, with practically the full quota of operatives back at work.

Mississippi, Water Valley. The Yocona Mills, makers of carpet warp yarns and twines, will start up October 1, after an idleness of seven or eight weeks. C. E. Romberger is superintendent and buyer.

*Rhode Island, Westerly. Operations have been started by the new Westerly Textile Co., making mosquito nettings and similar goods.

South Carolina, Blacksburg. The Iron City Cotton Mills have been incorporated with capital stock of $45,000 by C. M. Smith, J. E. Jeffries and A. H. Pollock and will take over and operate the Whittaker Cotton Mill of which Mr. Smith has been president. A receiver was appointed for the Whittaker Cotton Mill last July and this new company is a reorganization. The plant contains 5,000 ring spindles which have been operated on carded hosiery yarns, 10s to 40s, and it is understood this product will be continued by the new company which has bright prospects for a successful future.

*South Carolina, Charleston. The Royal Mills, a new corporation formed to take over and operate the plant of the Royal Bag & Yarn Mfg. Co., will begin manufacturing in October or November. F. W. Wagener, who purchased the property at the recent sale, is president; J. D. Koster, secretary, and R. A. Burris will be superintendent and buyer. There are 12,500 ring spindles and 340 looms in the mills which have been operated on ducks, osnaburgs, denims, sheetings and bag goods.

WOOLEN.

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New Mills.

Canada, Ontario, Renfrew. A new concern to be known as the Renfrew Textile Co., Ltd., has been organized with capital stock of $50,000 to manufacture blankets. Machinery is being brought from the old plant of the Lethbridge Woolen Co. of Lethbridge, Alberta, which discontinued about two years ago and includes 2 sets of cards and 12 looms with dyeing and finishing machinery. The stockholders include J. E. Barnet, Allan Francis, James Austin, Stephen Murphy, Daniel McAndrew, all of Renfrew. E. T. Carter, formerly connected with Horn Bros. Woolen Co., Ltd., of Lindsay, Ontario, will be in charge.

Pennsylvania, Philadelphia. The Royal Woolen Mills, with John Batty as proprietor and Jere Emery as superintendent, have leased the top floor of the building at Nicetown Lane and Kensington Ave., where they have installed 7 looms which they are operating on woolen and worsted fabrics for men's and women's wear. They are buying cotton and worsted yarns, 2/40s down, and woolen yarns, 20 cut down. The product is sold direct.

Pennsylvania, Philadelphia. The Adelphia Mfg. Co., H. D. B. Clapp and Joseph M. Reynolds, proprietors, have leased the one-story building at 4120-46 Kensington Ave., Frankford, in which they will install machinery for the manufacture of rags for carpet and rug weavers, which they will clean and dye, a dye house having been equipped by them for that purpose. They will also deal in cotton and woolen waste, bags, bagging, burlap, etc.

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Enlargements and Improvements.

Canada, Ontario, Pembroke. Changes and enlargements are to be made by the Pembroke Woolen Mills, Ltd., changing the plant from a 1-set mill to a 3-set mill. Contract has been awarded for the necessary new construction.

*Massachusetts, Caryville. Preparations are being made to begin the construction of the proposed enlargement to the dye house of the Caryville Mills of the Taft Woolen Co., which will double the capacity of this department. A. P. Clarridge of Milford is the contractor.

Massachusetts, Hampden. It is understood that the Hampden Woolen Co., which is the name under which W. B. Clark and W. J. Granger will operate the Scantic Mills purchased by them recently, will be changed over to electric power, the current being received from the Central Massachusetts Electric Co., which will extend its lines to the mill. This will bring electric lights within easy reach of the village.

Massachusetts, North Adams. A filtration plant will be built at the Hoosac Worsted Mills so that river water may be used in dyeing and finishing.

*Massachusetts, North Bellingham. Electric motors will be installed in two of the mills of the Bellingham Woolen Co. and contract has been made with the Edison Electric Illuminating Co. for power, as noted. One steam plant will be shut down. The work of concentrating the machinery is about completed as well as the repair work and manufacturing will be started shortly. Among other charges a new dam has been built and two new water wheels installed. This company purchased the plant of the Charles River Woolen Co. some time ago.

Massachusetts, South Royalston. In connection with the change of the Royalston Mill of the American Woolen Co. from a fancy woolens plant to a blanket mill, changes will be made in the machinery equipment. All the machinery in the mill on the south side of the river is to be removed and replaced by blanket looms and finishing machinery adapted to the new line on which the mill will be started up. J. J. Henderson, formerly superintendent of the Cordaville Woolen Mills, Cordaville, Mass., will be agent and will come here in a short time.

*Michigan, Eaton Rapids. In the future the Eaton Rapids Woolen Mills, Horner Bros., proprietors, will be operated by electric power, the terms for current from the lines of the Commonwealth Power Co. having been agreed upon.

New Hampshire, Claremont. John Roberts, manufacturer of wool cassimeres and cheviots, will erect a new mill building, 3 stories high, 38 by 60 ft., also enlarge the present boiler house by an addition, 60 by 60 ft., of cement construction. New spinning equipment will be installed.

New Jersey, Garfield. It is reported that the New Jersey Worsted Spinning Co., manufacturers of French spun worsted yarns, have placed an order abroad for dyeing equipment which will be installed in a building erected for the purpose as soon as received.

New York, Albany. Plans have been prepared for an addition to the plant of the Albany Felt Co., but the contract will not be awarded for several months.

Ohio, Cleveland. Little if any increase will be made in the equipment of the National Woolen Co., manufacturers of wool shoddies, extracts, wastes, etc., following the erection of the small addition which it has been reported would be put up at a cost of about $3,500. They state they do not contemplate increasing their equipment, but with the improved facilities, due to the erection of the addition, expect the production will be increased.

Pennsylvania, Philadelphia. Amos H. Hall Son & Co., manufacturers of cedar tanks and vats at 2915-33 N. 2d St., have been granted a permit for the erection and installation of a large tank in the plant of John Bromley & Sons, manufacturers of carpets and curtains, at Lehigh Ave. and A St. The tank will hold 20,000 gallons of water.

Pennsylvania, Philadelphia. Thomas Wolstenholme Sons & Co., spinners of French and Bradford spun worsted yarns, one of the largest plants of its kind in this vicinity, have recently placed an order for the equipment of a dyehouse with a capacity of 2,000 pounds of yarn per day, the intention of the company being to do its own dyeing in the future.

Rhode Island, Pascoag. The main plant of Fred L. Sayles Co., worsteds, has shut down for a few days for the purpose of making repairs to the power department.

*Rhode Island, Pawtucket. Work will be started immediately on the new steam plant and electric station for Messrs. D. Goff & Sons, which is to be completed by Jan. 1, 1913.

*Rhode Island, Providence. The installation of additional looms in the Langford Worsted Mills department of the Cleveland Worsted Mills Co. of Cleveland, O., is for the purpose of weaving fancy light weight worsteds.

Virginia, Bedford City. The Bedford Mills Co., woolen goods, uniform cloths, etc., are reported as planning the erection of an addition and the installation of machinery to double their carding and spinning departments. It is also stated that the changing of the plant from steam to electric power is contemplated.

*Virginia, Winchester. The increases to be made in the plant of the Virginia Woolen Co. include the installation of 1,440 new spindles, 2 sets of cards and 14 new looms. Flannels, cassimeres and cheviots are manufactured.

Wisconsin, Jefferson. An addition to the yarn department of John E. Owen & Son, 1 story high, 32 by 50 ft., is being made. The increase in equipment will consist of 1 set of 48-inch cards and 480 spindles. Woolen and merino yarns and knit tubing are manufactured.

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Mills Starting Up.

Maine, Bridgton. The American Woolen Co. will start up the plant formerly operated by the Forest Mills, purchased at auction last week, and Thomas Sampson will be transferred from the Ounegan Mill at Old Town to take charge as resident agent. Cassimeres will be made. William Deacon, Jr., now assistant superintendent of the Kennebec Mill at Fairfield, Me., will be superintendent under Mr. Sampson.

Massachusetts, Northboro. The plant formerly operated by the Woodside Woolen Co. on woolen cassimeres, which has been closed since last March, will be reopened by a new company. R. D. Green of Millbury will be president; George Felt, Northboro, treasurer, and John P. Leary, also of Northboro, manager. Robt. G. Henderson will be superintendent. Many of the stockholders in the old company are interested in the new concern, although some have dropped out. Operations will be started at once.

*Oregon, Stayton. John P. Wilbur has organized the Santiam Woolen Mills to take over and operate the old Stayton Woolen Mills which he purchased from the creditors of the old company in May. The new corporation has capital stock of $50,000, fully paid in, and will manufacture a line of all wool blankets, high grades, in white and colors. There are 3 sets and 12 looms, water and electric power, raw stock dyeing department and finishing room.

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Mills Shutting Down.

Iowa, Davenport. The mill of the Davenport Woolen Mills Co., carriage and auto robes, blankets and woolen goods, is shut down indefinitely.

Massachusetts, Monson. S. F. Cushman & Sons have discontinued manufacturing. The equipment of the plant comprising 5 sets of cards

and 25 broad looms, has been sold to the Brierly-Lombard Co. of Worcester, and is being removed from the building

KNIT.

New Mills.

*Canada, Ontario, Niagara Falls. The Visor Knitting Co. of Niagara Falls, New York, expects immediately to alter and repair the old Armory building recently leased to adapt it to the manufacture of sweater coats and toques. A considerable quantity of up-to-date knitting machinery will be installed. The Canadian plant will be conducted and a branch of the Visor Knitting Co. of Niagara Falls, N. Y., under the same name and by the same corporation unless it should be necessary to incorporate in Canada to comply with the requirements. In any event the people interested will be the same.

Canada, Quebec, Montreal. The Perfecknit Mfg. Co. has established a new plant at 579 St. Paul St. and is manufacturing a line of sweater coats and knitted novelties.

Indiana, Richmond. The Quaker City Knitting Mills have begun manufacture of men's half hose, with office at 20 South 22d St. and mill at West 3d St. and the railroad. They have an equipment of 15 full automatic 84-needle knitting machines, 2 ribbers and 2 loopers, operated by electricity, and are using 6s and 8s mock twist yarns in blue and white, brown and white and black and white, single 10s uncolored and a cheaper frame spun yarn in single 12s, 16s and 20s, blue, brown, black and uncolored. They have a capacity of 150 dozen pairs daily and are selling direct to jobbers. R. E. Losey is superintendent and buyer.

*Maine, Portland. The Portland Knitting Co., reported incorporated in August with capital stock of $10,000, is establishing a plant at Congress St., corner of India St., for manufacturing sweaters, caps and similar goods. Samuel Seiger has been elected president and Benj. Press, treasurer.

*Maryland, Boonsboro. Thirty knitting machines will be started up in the new branch here of the Blue Ridge Knitting Co., Hagerstown, Md. All the operatives that can be secured will be given employment and upon this factor will determine the amount of machinery that will be brought here.

*Maryland, Frostburg. It is expected operations will be started in the branch mill of the Parker Hosiery Mill & Dye Works, Inc., of Portsmouth, Va., about October 1, making seamless hosiery. Fifty knitting machines are to be installed and will be operated by electric power, giving employment to from 60 to 75 hands. D. M. Mullin, formerly of Mechanicsburg, Pa., will be superintendent and the buying will be done by H. A. V. Parker.

Massachusetts, Cambridge. A knitting factory is to built in Cambridge by a concern known as O'Brien & Cook, composed of W. A. O'Brien, president, and G. O. Cook, manager, of the Sterling Knit Goods Co., 22 Randolph St., Boston. The building will be equipped by the Sterling Knit Goods Co., which will remove from its present quarters. It will be of reinforced concrete construction, 4 stories high, and will cost approximately $55,000. Every modern improvement will be installed and Mr. O'Brien states that they plan to have one of the most modern factories ever equipped. Radical changes are planned in the business of the Sterling Knit Goods Co., in the equipment and in the lines manufactured, and there will be an increase of fully 50 per cent. Sweaters and full fashioned union suits for men and women are manufactured in the present plant on 85 knitting machines and 54 sewing machines. Henry F. Bryant, Brookline, is the architect.

Minnesota, Duluth. F. A. Patrick & Co., proprietors of the Patrick-Duluth Woolen Mill and wholesale dealers in dry goods, have plans for a large 3-story building to be used for making knit goods and garment manufacturing. A site has been purchased, 140 by 400 ft., on Superior St., between 29th and 30th Sts. The building proposed will be in two sections, each 60 by 140 ft., connected by another building, 50 by 80 ft. One large section will be used for garment manufacturing and the other for a knitting mill. The woolen mill will continue in the present quarters. It is estimated the building will cost $100,000. The wholesale department does a large business in hosiery, underwear and sweaters which seems to insure the success of a knitting department. Construction work is expected to be started very soon.

Minnesota, Minneapolis. C. N. Weyer and C. F. Tosney, at present doing a general merchandise business at Mullan, Ida., under the firm name of Weyer & Tosney, have leased the factory property formerly occupied by the Nelson Bros. Knitting Works and installed automatic knitting machinery, sewing and finishing machines, which they are operating on high grade sweater coats. Enough machinery has been installed to do a business of $50,000 the first year. Additional machinery will be installed for the manufacture of heavy all wool underwear. The firm name is Weyer & Tosney Knitting Co. The equipment formerly in this mill was moved to Superior, Wis., when the Superior Knitting Mills at that place succeeded the Nelson Bros. Knitting Works of Minneapolis and the St. Paul Knitting Works of St. Paul.

New York, Brooklyn. The Cypress Knitting Mills, reported incorporated last week with capital stock of $10,000, are manufacturing men's, women's and children's sweaters and bathing suits at 152 Shepherd Ave., Brooklyn, on 10 knitting and 10 sewing machines, operating by electric power. The officers are Paul Scheftel, president and buyer, and Geo. A. Einsetler, treasurer.

*New York, New York City. Four machines for making 5-yard goods and auxiliary machinery have been installed in the plant of the new Italian Silk Underwear Co., 139th St. and Morris Ave., to make silk underwear fabric and silk underwear. More machinery will be added later. M. S. Siegel is president, treasurer and buyer. The office is at 125 W. 22d St.

New York, Oswego. The Wm. H. Spanswick Mfg. Co. of Fulton have purchased the mill building at Oswego, erected about two years ago by James A. Shufelt, formerly superintendent of the Conde Mill, who planned to organize a company and engage in the manufacture of union suits. The Spanswick company will install equipment for manufacturing 700 dozens daily of children's ribbed underwear and Mr. Shufelt will act as manager for them.

New York, Parish. The Wm. H. Spanswick Mfg. Co. of Fulton have purchased a factory building in Parish for the purpose of establishing a branch plant. The building is in good condition and can be used as an underwear factory with practically no changes. It will be equipped with machinery to give a production of 300 dozens daily of children's knit underwear.

Pennsylvania, Norristown. The Wallace Wilson Hosiery Co., Frankford, Philadelphia, manufacturers of seamless half hose and children's and infants' hosiery, will establish a branch factory in a building at DeKalb and Marshall Sts. An agreement has been made with the Chamber of Commerce to give employment to 100 hands.

Pennsylvania, Philadelphia. Parties who will operate under the name of the Home Knitting Mills, are equipping a plant for the manufacture of sweater coats, bathing suits and fancy knit goods at 5th and Lehigh Ave.

Pennsylvania, Philadelphia. The Globe Knitting Mills have been started up at 27 and 29 S. 7th St., where they have installed 9 knitters on which they are manufacturing a line of knitted silk neckties. They are selling direct.

Pennsylvania, Pottsville. John Houck is arranging to start a plant for the manufacture of children's ribbed vests with 6 knitting machines and complementary equipment for a plant of this kind.

Pennsylvania, Reading. It is reported that Ammon & Miller have taken over a small building in Gibraltar, a small town outside of this city, in which they are installing machinery for the manufacture of hosiery.

Pennsylvania, Wrightsville. Joseph Black & Sons Co. of York, manufacturers of seamless and full fashioned half hose and infants' and children's hosiery, have leased the third floor of the Huber Bldg., and will start a branch factory here. Employment will be given to about 50 operatives.

SILK.

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New Mills.

*Connecticut, Rockville. Round braided silk specialties, including cords, etc., will be manufactured by Julius H. Mueller & Co., reported in last issue as to establish a plant at 14-16 Morrison St. Work on the building has been started and production will begin probably about Dec. 1. Sixty braiders and the necessary winding and other machinery will be installed and operated by electricity. Julius H. Mueller will be superintendent and buyer, and the other members of the concern, who will be active heads of departments, are O. H., P. C. and R. M. Mueller. The equipment has been pretty well contracted for, and the company states that all supplies will be purchased on a strictly cash basis.

New Jersey, Jersey City. Thos. B. Kazanjian is starting a broad silk plant at 330 Westside Ave., where 14 looms have been installed. Space is available for an increase if the business warrants.

*New Jersey, Paterson. The Maywood Silk Co., recently incorporated, has purchased some of the equipment formerly operated by the John W. Taylor Silk Co. and moved it to the Dordoni Mill. Broad silks will be manufactured on equipment of 40 looms.

*Pennsylvania, Herndon. Work has already been started on a building for the new silk throwing plant of F. Q. Hartman, Inc., of Danville, Pa. It is hoped the new mill will be completed by the middle of October.

Pennsylvania, Mechanicsville. F. Q. Hartman of Danville, Pa., is building a mill here to be equipped for silk throwing. Mr. Hartman is also building a new mill at Herndon, Pa.

*Pennsylvania, Nazareth. McCollom & Post of Paterson, N. J., who will build a new silk mill here at Wood and Madison Aves., expect to begin construction work in two weeks. The new mill will be of brick construction, 150 by 50 ft., 2 stories high, and will start with 50 looms.

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Enlargements and Improvements.

Massachusetts, Taunton. Additional looms are being installed in the Taunton River Mills. Silk and silk and cotton dress goods are manufactured and the company is preparing for a busy fall and winter.

*New Jersey, Paterson. Kauffman & Tane have moved to the Strange Mill, and are adding 10 more broad silk looms.

New York, Elmira. A new engine room is being built at the plant of the Read & Lovatt Mfg. Co., 5th St. and Madison Ave., commission silk throwsters, and when completed the present engine room will be converted into a part of the mill proper and used for manufacturing. Other improvements and enlargements are contemplated.

*New York, Fultonville. The new mill of the Mohawk Silk Fabric Co. is completed. This building is to replace the one destroyed by fire a little less than a year ago and is partly a rebuilding of the old plant and partly a new addition. It will give an increase in the cloth or weaving department of 100 per cent. and an increase in the glove and underwear capacity of about 50 per cent. Temporary quarters are occupied at present.

*New York, Sidney. The 2-story brick addition to the plant of Julius Kayser & Co., for which ground has been broken, is to be completed November 1. The new mill will be 45 by 150 ft. and when equipped will give employment to about 60 additional hands. The main plant is at 220 Taffee Place, Brooklyn.

New Publications

(Any work noticed under this head can be obtained through the office of this journal.)

Guide to the Ring Spinning Frame, by Nicholas Booth; 73 pages, 4 1/2 by 7 1/2; D. Van Nostrand Co., 23 Murray St., New York. Price $1.25.

Practically all of the literature on ring spinning is to be found in books treating also of other branches of textile manufacturing. This volume, however, is confined to ring spinning and thus an inexpensive handbook is provided for those who desire to confine their study to this particular branch of spinning. The mechanism and operation of the frame are made clear by concise explanations and a number of illustrations. The calculations required in connection with ring frames are illustrated by thirty-three examples. The book also contains tables on square roots of numbers from 1 to 100, breaking weight of yarn, yarn counts and weights of travelers.

Jacquard Mechanism and Harness Mounting, by Fred Bradbury; 355 pages, 5 1/2 by 8; John Heywood, Ltd., Manchester, England. Price $3.50.

The author has treated the subject under three general heads. The first part deals with the evolution of figures and jacquard weaving in the following chapters: Origin and Growth of Pattern Design, Fundamental Principles of Weaving, Hand Loom Weaving, The Draw Loom, British Efforts to Supplement or Supersede the Draw Loom. French Efforts to Supersede the Draw Loom. The subject of the second part is modern jacquard mechanisms, classified as follows: The Single Lift Jacquard, Double Life Jacquard Machines, Cross Border Jacquard Mechanisms, Twilling Jacquards, Compound Driving of Twilling Jacquards, Pressure and Split Harness Weaving and Mechanism, Gauze or Leno Jacquards; the Gauze Reed and Jacquard, The Swivel and Jacquard, Index and Special Types of Jacquard Machines. The third and concluding part of the volume relates to harness mounting, which the author deals with under the following heads: Principles and Routine of Harness Mounting, Principles and Varieties of Harness Mounting, Harness Mounting, Designing, Card Stamping, Repeating and Lacing. Mr. Bradbury is well known as the author of Carpet Manufacture, Calculations in Yarns and Fabrics, and Worsted Spinning. In this volume he has given the trade a handbook on jacquard weaving which comes up to the standard of his former works. The volume is freely illustrated.

Researches on Cellulose, Part 3, 1905-1910, by C. F. Cross and E. J. Bevan; 170 pages, 5 1/2 by 8; Longmans, Green & Co., New York.

The first part of this series was published some years ago and gave the researches between 1895 and 1900. The second part brought the subject up to 1905 and now the present volume treats of the progress in research of cellulose for the period from 1905 to 1910. A portion of the research work of 1911 is also included, the subject being treated in five chapters as follows: Cellulose in Relation to Biological Science; Cellulose, Normal Cellulose, Constitution; Cellulose Esters, Acetate and Comparative Studies of Acetylation Formyl Derivatives, Xanthogenic Esters; Lignocellulose, Reactions with Halogens, Constitution, Study of Autoxidation; Technical Developments, Textile Industries; Bleaching, Paper Making, Commercial Jute, Artificial Fibers, Film Products, Applications of Cellulose Acetates.

The Use of Fats and Their Products in the Textile Industry (Die Anwendung von Fettstoffen und daraus hergestellten Produkten in der Textil-Industrie), by Franz Erban; 364 pages, 6 1/2 by 9 1/2; Wilhelm Knapp, Halle, Germany. Price $6.00.

The author begins with wool washing and takes up the fats, greases and other products used in the successive processes of wool manufacturing. This is followed by similar sections relating to artificial silk, flax, hemp, ramie, jute and cotton. Turkey red oil and other oils used in dyeing, bleaching and washing are treated in considerable detail. There are valuable chapters on textile soaps, softening materials, mineral oils and bleaching soap. One chapter is devoted to the tests for fats, oils, alkalies and water. The text is in German.

The Year Book for Colorists and Dyers, by Herman A. Metz; 503 pages, 5 1/2 by 7 1/2; Farbwerke-Hoechst Co., New York.

The fourteenth volume of this year book has been carefully revised so as to keep it abreast of the latest developments in the dyeing department. It begins with tables to which the dyer and chemist have frequent occasion to refer. These include metric equivalents of the established English system and English equivalents of the metric system, also comparison between Beaume and Twaddle density of various solutions. Part 2 is devoted to the eighth International Congress of Applied Chemistry. The patents relating to dyeing and allied processes are listed in Part 3. Part 4 consists of notes on processes and new colors. The organization and courses for the various textile schools are described in Part 5. Part 6 consists of a list of dyestuffs, including the names of the manufacturers and method of dyeing. Part 7 consists of miscellaneous notes of interest to dyers and chemists. There is an index which enables quick reference to any subject desired.

BUSINESS LITERATURE

Manila Rope; C. W. Hunt Co., West New Brighton, New York.

A brief treatise on ropes used for the transmission of power, together with formula, tables and data useful in mill engineering. The booklet also contains many excellent illustrations of manila rope before and after treatment.

The Foster Superheaters; Power Specialty Co., 111 Broadway, New York.

A 32-page booklet describing and illustrating the Foster superheaters. The features of the Foster superheater which distinguish the construction from all other types are chiefly the result of actual experience in designing and building superheaters. The booklet also includes complete tables showing the carrying capacity of extra heavy steam pipes, and the properties of saturated steam.

Industrial Notes

LOCKWOOD, GREENE & CO. IN NEW OFFICES

Lockwood, Greene & Co., architects and engineers for industrial plants, have removed their Boston offices from 93 Federal St. to 60 Federal St., where they occupy the seventh, eighth and ninth floors of the new First National Bank Building. The new offices will provide better facilities for handling the rapidly increasing business of this concern, including the design of industrial plants, investigation and design of water power developments, steam, water and electric power plant tests and the valuation and reorganization of existing plants, as well as acting in the capacity of permanent consulting engineers for many industrial concerns.

A BUSY PLANT

Jacob K. Altemus, builder of winding and spooling, warping and beaming machinery, 2824 North 4th St., Philadelphia, reports that his plant is being run to its full capacity to keep up with his orders on winding machinery for real and artificial silk. His latest model winder has proved very satisfactory. Mr. Altemus has made a specialty of winding and spooling machinery and gives personal attention to the problems which are presented to him by manufacturers for handling yarns of all kinds.

BARBER KNOTTER PATENT UPHELD

A Court decision has been handed down in the case of the Barber-Colman Company vs. Byrd Mfg. Company authorizing an injunction refraining the Byrd Mfg. Company, its officers and agents from infringing patents Nos. 672636 and 755110 and refers the matter to a special Master to take and state an account of the damages sustained by the complainants by reason of such infringement.

In the case of the English licensees under the Byrd Knotter patents, we are informed that after spending considerable time and money in defending a suit against them, they have recently agreed to submit to a permanent injunction, to pay damages and costs and to deliver all of their Byrd Knotters to the Barber Colman Company for destruction.

A BIG ROOFING JOB.

The problem of finding a satisfactory roof for the Memphis union stock yards was one that was carefully studied.

The new buildings are generally considered to be the most modern, up-to-date stock yards in the world and it was important that the 400,000 square feet of buildings should be covered with a durable fire proof roofing. The buildings are situated alongside of the railroad and the fire risk was believed to be too great for shingles or any other inflammable roofing and on account of the enormous space to be covered, a roofing unduly high in cost or necessitating frequent painting or other attention in the way of repairs and renewals was considered impracticable.

After a thorough investigation the J-M asbestos roofing made by the H. W. Johns-Manville Co. of New York was selected and all the buildings have been covered with the roofing. This fabric is made of pure, long-fibered asbestos (stone) felt, securely cemented together with a combination of Trinidad and other natural asphalts—two indestructible minerals.

THE CRESSON-MORRIS COMPANY

Announcement is made of the consolidation of the plants and business of the George V. Cresson Co. and the Morris Engineering Co., under the name of the Cresson-Morris Co., Philadelphia, Pa. These well known manufacturers have won a high reputation for their products, which include power transmitting machinery, rope transmission, machine moulded iron or steel gears, cut and mitre gearing, Buchanan rock crushers and concentrating machinery, Weston centrifugals, vacuum pans, multiple effects, crystallizers, special machinery and chemical machinery. The combined facilities of both old companies insure better service and a wider field of usefulness for the Cresson-Morris Co. The officers of the new company are P. H. Morris, president; A. S. Morris, vice-president; Gouverneur Cadwalader, secretary and treasurer; Henry G. Morris, consulting engineer; Joseph M. Hewlett, office manager, and Charles H. Moyer, the New York representative.

HAWAII: AMERICAN AND BRITISH IMPORTS

The imports into the Hawaiian Islands of goods from the United States last year were valued at £4,650,450, against imports from all other countries combined of a value of £1,081,340 only. The explanation is to be found, of course, in the fact that American imports have the enormous advantage over those of other countries in having to pay no duties. In these circumstances, Acting-Consul Harrison writes that, notwithstanding the natural growth of the trade of the British territories bordering on the Pacific—Australia, New Zealand, and Canada—the total import trade from the British Empire in the latest year is only about 6 1/2 per cent. of the whole, which is a great decline from the percentage ruling before annexation in 1898. Such imports as there are, are only of a few specialties for which there is some de-

mand. "Speaking generally," says Mr. Harrison, "the outlook for imports, from whatever portion of the British Empire, is in no sense bright, as the application of the United States tariff system to the islands gives an overwhelming advantage to United States suppliers of Hawaiian demands."

It is facts of this sort—not any great desire for protection for its own sake—that have made Tariff Reformers in England by the tens of thousands. If our Free Traders had made any endeavor to remedy such wrongs of British producers and merchants, Tariff reform would have been a negligible factor today and for many years to come.—Textile Mercury.

THE KISSEL MOTOR CAR

"It is difficult to understand why any business man using horses for delivery should remain in ignorance of what power wagons could do for him as a substitute," says President George A. Kissel of the Kissel Motor Car Company, Hartford, Wis. "Unless the conditions of his business are very unusual, three to five horse outfits can be replaced by one motor truck, the number depending on the size of the truck and the nature and extent of the service demanded of it. It is very simple to figure from this basis whether it would not be a good idea to take up the subject with experts for further light. It would seem, in the face of the fact that many concerns are saving thousands of dollars annually through motor delivery, that every man with a delivery problem ought to be posted on what trucks will do for him, especially as it costs nothing to find out.

"Here are a few motor truck truths worth remembering. A motor truck will work twenty-four hours—the longer the better. In taking the place of horses it substitutes precision for uncertainty. Weather conditions will not affect it—no exhaustion from heat, no ills from exposures to cold. It solves the distance factor, widening trade territory and increasing customer-satisfaction. It is a token of progress, the best possible advertisement of up-to-dateness, permanency and reliability."

WIGHTMAN & RICHARDS

Joseph A. Richards & Staff, general advertising agents, Tribune Bldg., New York, announce the formation of a technical department to be known as Wightman & Richards. It will specialize on advertising and marketing engineering and technical products.

Mr. Wightman is a graduate of the School of Engineering of the University of Colorado and has had an all round engineering experience and occupied positions of responsibility with important concerns. Coupled with this is a practical experience in connection with trade paper work.

Paul Morse Richards, also of the organization, had been an advertising sales manager and has had a large amount of experience.

Rhode Island, Providence. A storage building, 48 by 143 ft., will be built for the Providence Dyeing, Bleaching & Calendering Co. The contract has been let.

A TURBINE DRIVEN PUMP

A steam turbine driven centrifugal pump of 100,000,000 gallons per day capacity is to be installed in the Ross pumping station of the Pittsburgh water works by the DeLaval Steam Turbine Company, Trenton, N. J. This pump will be the largest steam turbine driven centrifugal pump ever built in this country, the rated capacity of one hundred million gallons per day against a total head of 56 feet amounting to over 980 water horse power. The pump is guaranteed to show a duty of 115,000,000 foot pounds per thousand pounds of dry steam, all steam used by the condensing equipment being charged to the main unit.

THE MOHAIR TRADE

From the annual report for 1911 of Mr. C. du Plessis Chiappini, the trades commissioner of the Union of South Africa, it appears that mohair occupies third place in volume among the agricultural export trades of the Union.

When mohair was first put upon the market it brought nearly four times the price that it does at present. In 1865, when South Africa was tentatively beginning to export to Great Britain in competition with Turkey, its exports were under 10,000 pounds, while Turkey's were over 5,000,000 pounds. The average price per pound was about 75 cents. By 1870 the price had risen to nearly 94 cents per pound, South African exports had increased to over 250,000 pounds, and Turkish shipments had decreased to a little over 2,000,000 pounds. Since that time, however, prices have remained steadily on the down grade. During the last dozen years Great Britain has imported annually something like 25,000,000 to 30,000,000 pounds of mohair, of which, as a rule, South Africa has supplied considerably more than half, and the price has averaged from 32 cents down to not much over 24 cents per pound.

South Africa has never succeeded in competing with Turkish mohair in quality. For instance, last year (1911) Turkey sent to Great Britain 6,533,600 pounds, valued at $1,967,525, while South Africa sent 18,712,000 pounds, nearly three times the quantity, but obtained only about double the value, namely, $3,927,265. During the year the average price of Turkey mohair sagged from 33-34 cents to 31-32 cents, but Cape first declined from 27-29 cents to 24-27 cents and Cape winter from 22 1/2-23 cents to 19-19 1/2 cents. Fashion, of course, is to blame for this general sag in prices which has occurred while the total imports of mohair amounted to only 25,000,000 pounds. In 1907 British total imports amounted to nearly 31,000,000 pounds, and the price averaged 31.16 cents per pound.

ARABOL COMPOUNDS

Finishing compounds of tried excellence for bleach and print works, as well as cotton piece goods, are made in great variety by the Arabol Mfg. Co., 100 William St., New York City, who make a specialty of sizings and finishing compounds, and alizarine assistants for the use of textile manufacturers.

DUPLEX CARDING DEVICE

The patent duplex carding device invented by P. Hardman, superintendent of the American Thread Co., Willimantic, Conn., and exclusively made and marketed by the H. & B. American Machine Co., Pawtucket, R. I., is meeting with great success, and has already been installed into over one hundred and fifty different mills. The majority of these mills first placed sample orders for the device and, after a thorough trial under conditions in their own mills have placed repeat orders. Several mills have already applied these devices to all of their cards, and judging from the large number of repeat orders which are being received, there is no doubt that the claims made for the device are fully met. Description of this device has previously appeared in our columns.

SOME NEW METACHROME COLORS

The Berlin Aniline Works have recently brought into the market some valuable additions to the well-known group of Metachrome Colors; viz., Metachrome Blue-Black 2 B X and R and Metachrome Blue G, B and R. These new dyes can be employed for dyeing loose wool, slubbing, bobbins and yarns as well as for piece dyeing. Besides the advantage of their simple manner of dyeing, which will be described later on, the above mentioned products are in the first place distinguished by good leveling power and excellent fastness to light and wear. The new Metachrome Blue-Black 2 B X is very similar in shade to the older 2 B brand; the new R brand yields redder shades. These colors alone, or in combination with Metachrome Blue G and B, are very important for the production of grey shades fast to wear.

Metachrome Blue G, B and R are much brighter in shade than the Metachrome Blue-Blacks, and are very well suited for fast navy blues, especially for the production of blue serges. On account of the excellent leveling and penetrating power, these new Metachrome colors are exceedingly well adapted for piece dyeing; they, furthermore, leave vegetable effect threads practically white.

They are very well suited for combinations with other Metachrome colors, dyed according to the well-known Metachrome process. Metachrome Blue-Black 2 B X and R may also be dyed in an acid bath and developed by an aftertreatment with bichromate of potash and, therefore, may also be combined with other level dyeing colors of this character. The solubility of these dyes is perfect; they dissolve without any residue both in soft and hard water, on account of which they are very well adapted for dyeing in machines of the circulating or vacuum type.

Attention has been called already to the very important properties of leveling and penetrating, which are excellent indeed even in light shades. While vegetable effect threads remain almost white, silk effect threads are slightly stained.

The fastness to light and weather is very good, even in lighter shades, when dyed as grev. Also in other respects these new colors exhibit good properties. The fastness to washing and milling, as well as to cold and boiling water, is good. Their resisting power to the process of decatizing, to acid milling, stoving, ironing, perspiration, alkalies (fastness to street dust) and acids is good. Very good is their fastness to carbonizing.

The process of dyeing is very simple and they all can be dyed according to the Metachrome process as follows:

When dyeing loose wool add about 10 per cent. Glaubersalt Crysts. to the dye bath.

The dye is dissolved in hot water and then added to the bath, next the mordant, likewise previously dissolved.

Enter boiling hot with the material, work for about 10 minutes without steam and then boil for about 2 hours.

When dyeing slubbing, cops, bobbins, woolen yarns, and piece-goods, prepare the dye bath with about 10 per cent. Glaubersalt Crysts. Dissolve the dye in boiling water with an addition of about 1/2 per cent. ammonia (sp. gr. 0.910) of the weight of the goods, and add to the dye bath through a sieve. Then add the Metachrome Mordant, likewise previously dissolved boiling.

It is advisable further to add to the dye bath 2 to 3 per cent. liquid Acetate of Ammonia.

The same quantity of Mordant must be taken as of Dye, but never less than 2 per cent. Mordant.

For the production of grey shades with Metachrome Blue-Black 2 B X and R, as well as with Metachrome Blue G and B, up to 1 per cent. dye, it is advisable not to use more than 2 per cent. Mordant, but an abundant quantity of Glaubersalt should be taken.

Enter at about 100° F., allow to circulate for 10 to 15 minutes without steam, raise to the boil in 3/4 to 1 hour and boil 2 to 2 1/2 hours. The heating must be regular and slow in order to ensure the production of level dyeings.

Metachrome Blue-Black 2 B X and R can also be dyed acid and then afterchromed.

For the production of dark shades the following method can also be employed for Metachrome Blue-Black 2 B X and R.

A full Blue-Black is produced with about 4 per cent. dye with the addition of

20% Glaubersalt Crysts.
3-5% acetic acid (30% strong) or 1-2% formic acid (90% strong).

Enter at 120 to 140° F., raise to the boil during about 3/4 hour and boil for about 1/2 hour.

Then add

1-1½% sulpuric acid, well diluted,

and, in order to exhaust the bath, boil for a further 1/2 to 3/4 hour.

Finally fix the dye by boiling for about 3/4 of an hour in the same bath with

1½% bichromate of potash

and rinse.

These colors can also be dyed on chrome-mordanted wool in the usual manner; in this case, however, when using Metachrome Blue G, B and R, a slight aftertreatment with bichromate of potash (about 1/4 per cent. bichromate of potash of the weight of the material) is advisable.

EVENING CLASSES

To young men in the vicinity of Boston, the evening classes of the Boston Young Men's Christian Association at 48 Boylston St. offer splendid opportunities for instruction in practical lines.

The studies are so arranged that the student may spend one, two, three, or four evenings each week in class instead of the regular five or six evenings required by the more extended regular course in night schools.

Studies include penmanship, shorthand and typewriting, bookkeeping, salesmanship, languages, and preparation for Civil Service examinations.

Fees are very small.

Besides that the student gets the benefit of the Union Building with its many attractive, homelike rooms so centrally located.

STEADILY GOING FORWARD

Massachusetts savings bank life insurance has today 6,618 policyholders and insurance in force to the amount of $2,495,431. The fourth savings bank issuing life insurance policies is the City Savings Bank of Pittsfield. Through the cordial cooperation of manufacturers new agencies are continually being established. At the American Hide & Leather Co., Lowell, a mutual benefit association with more than 150 members has provided for its death benefits through savings bank life insurance policies. Nothing indicates better the growth of savings bank life insurance than the increase of the premium income of the insurance departments of the savings banks. For the month of August, 1911, the premium income was $5,615.22 and for the month of August, 1912, the premium income amounted to $8,343.01. This is an increase of 48.5 per cent.

CHAMBERS OF COMMERCE

Jerome C. Read, President of the Silk Association of America, has appointed the following committee to represent the Association in connection with the Chamber of Commerce of New York and the Merchants' Association, in entertaining the foreign delegates to the Fifth International Congress of Chambers of Commerce when in New York on October 17th and 18th:

Charles Cheney, Cheney Brothers; D. George Dery, D. G. Dery; M. W. Dippol, National Ribbon Company; Henry D. Klots, Klots Throwing Company; M. C. Migel, M. C. Migel & Company; Jerome C. Read, The Read & Lovatt Mfg. Company; William Skinner, Wm. Skinner & Sons; Robt. J. F. Schwarzenbach, Schwarzenbach, Huber & Co.; Altonso P. Villa, A. P. Villa & Bros.; Ramsay Pougnet, Secretary, Silk Association of America.

Hatheway & Reynolds and the Okana Knitting Co., both of Oriskany Falls, New York, have opened selling offices at 366 Broadway, New York City.

PUBLICITY ENGINEERING

Walter B. Snow, pioneer in this line of work, defines Publicity Engineering as a combination of practical engineering knowledge and advertising experience regarding technical matters.

The publicity engineer must first of all be an engineer capable of dealing understandingly with the engineering and mechanical problems of his clients, and he must also be acquainted with the different varieties of publicity work, including trade paper advertising, preparation of catalogues, mail work and the ability to prepare articles and notices for his clients of sufficient news value to render them acceptable to the various trade papers. In order to get a place in the reading pages and technical columns, an article must have the proper degree of material interest to the readers of the publication.

Associated with this organization is a staff of men who are experts in various lines of mechanical work, so that each client is assigned to a specialist who has experience in his particular field.

Mr. Snow himself has had many years' practical training in engineering and publicity matters while in charge of this work for the B. F. Sturtevant Co.

His offices at 170 Summer St., Boston, Mass., are conveniently located near the South Station.

AUTOMATIC SPRINKLERS AND INSURANCE RATES

Figures gathered by the Chicago Association of Commerce and showing average results in that city, may be partially tabulated as follows:

	Building	Contents
Mill constructed buildings with sprinklers	$ .23	$ .32
Mill constructed buildings without sprinklers	.57	1.04
Ordinary constructed buildings with sprinklers	.31	.40
Ordinary constructed buildings without sprinklers	.77	1.19

If we start with the assumption that in the average manufacturing or storage building the contents are worth double the value of the building, we may obtain a general index for comparing buildings protected with automatic sprinklers and buildings not so protected. Mill constructed buildings on this basis will show an index of 87 for the protected buildings where the unprotected building is 265 or more than three times as great a rate. This means that the reduction in the rate is no less than 67.2 per cent. On the same basis, buildings of so-called ordinary construction would show an index of 111 when protected by automatic sprinklers and 315 when not so protected. In this case the reduction in the rate is 64.8 per cent.

A stronger argument in favor of the use of automatic sprinklers could scarcely be found, especially when we remember that this saving in dollars will ordinarily pay for the entire sprinkler equipment inside of a period of five years.

Recent Textile Patents

BOBBIN-GRIP. 1,036,161. Frank H. Stetson, Lawrence, Mass.

BOBBIN-TURNING Machine. 1,038,499. William C. Farnum, Fitchburg, Mass.

CLOTH LAYING and Piling Apparatus. 1,036,011. Charles C. Schreider, St. Louis, Mo.

COP or Bobbin. 1,038,971. Claes Ryden, Providence, R. I.

DRYING and Bleaching. 1,037,370. John D. Tompkins, Valatie, N. Y.

DRYING APPARATUS. 1,037,254. Henry S. Hopkins, Brooklyn, N. Y.

FABRICS and Spun Goods, Finishing, Filling, Loading or Dressing Textile. 1,036,282. Leon Lilienfeld, Vienna, Austria.

FABRIC-DRYING Apparatus. 1,038,002. Johannes H. Schaller, Troy, N. Y.

FIBER, Decorating. 1,036,163. Harry P. Taber, Wilmington, Del.

HOSIERY. 1,037,669. Robert W. Scott, Leeds Point, N. J.

HOSIERY-DRYING Mechanism. 1,037,224. William H. Ermentrout, Reading, Pa.

KNITTING. 1,038,043. Bert Wessell, Johnstown, N. Y.

KNITTING MACHINE. 1,038,044. Bert Wessell, Johnstown, N. Y.

KNITTING MACHINE. 1,038,638. Exilias Paquette, Lowell, Mass.

LOOM, Automatic Weft Replenishing. 1,038,888. Denis M. Hollins, Blackburn, Eng.

LOOM HARNESS. 1,036,132. Bernard McAneany, Fitchburg, Mass.

LOOM SHUTTLE. 1,038,048. Adolph and Samuel Widmer, Paterson, N. J.

LOOM SHUTTLE. 1,037,528. William H. Portner, Gadsden, Ala.

LOOM SHUTTLE. 1,036,699. Charles G. Petzold, Providence, R. I.

LOOM SHUTTLE Motion. 1,036,483. Joseph A. Gendron, Nashua, N. H.

LOOM SHUTTLE, Self-Threading. 1,037,020. Henry A. Kennedy, Natick, R. I.

LOOM TEMPLE. 1,037,358. Edward S. Stimpson, Hopedale, Mass.

LOOM TEMPLE. 1,038,169. James Marvel, New Bedford, Mass.

LOOMS, Automatic Spool-Chafing Apparatus for. 1,038,678. Albert G. Koechlin, Steinen, Germany.

LOOMS, Magazine-Stop for Weft Replenishing. 1,038,678. Edward S. Stimpson, Hopedale, Mass.

PILE FABRIC, Woven. 1,038,532. George Crossland, Long Island City, N. Y.

SHUTTLE-THREADING Device. 1,038,777. Cornelius Miller, Providence, R. I.

SPINDLE. 1,037,324. William L. Robinson, Concord, N. C.

SPRING APPARATUS. 1,037,318. Alonzo E. Rhoades, Hopedale, Mass.

SPINNING DEVICE. 1,036,425. Gianni Bettini, Paris, France.

SPINNING FRAMES, Builder for Ring. 1,037,645. Michael J. Leahy, Waterville, Me.

STOCKING. 1,036,196. Ellen W. Decker, New York.

THREAD END into Cops, Apparatus for Drawing the. 1,038,554. Emil Fritsch, Weiler, Germany.

UNDERGARMENT. 1,038,620. Angeline A. McAllister, Cedarview, Utah.

VELVET, Figuring. 1,037,975. Fritz Pastor, Krefeld, Germany.

WEAVE. 1,037,752. James C. Gaynor, Paterson, N. J.

WEAVING, Harness for Cross. 1,037,150. Jacob Kaufmann, Philadelphia, Pa.

YARN-CONE. 1,037,295. Michael T. Murphy, Grand Rapids, Mich.

YARNS, Apparatus for Cleansing, Washing or Dyeing Woolen, Cotton and Other. 1,037,461. Paolino Fincato, Milan, Italy.

RECENT TEXTILE TRADE MARKS REGISTERED

64,501. Elastic webbing. Mark: Unelco. Owner: Kops Bros., New York.

64,571. Cotton and woolen knitted underwear. Mark: L. D. S. Owner: Utah Knitting Co., Ogden, Utah.

62,603. Sheets and pillow cases. Mark: Tuxedo. Owner: Naumkeag Steam Cotton Co., Salem, Mass.

63,170. Woolen dress goods in the piece. Mark: Tyl Tyl. Owner: Haas Bros., New York.

64,145. Overalls, trousers, etc. Mark: Pride of Texas. Owner: Weiler Mfg. Co., Corsicana, Texas.

64,158. Hosiery. Mark: PWR. Owner: Charles B. Rouss, New York.

64,362. Handkerchiefs. Mark: Sunrays. Owner: J. Robinson & Co., New York.

64,662. Sweater-coats, hoods, etc. Mark: The Visor. Owner: Visor Knitting Co., Niagara Falls, N. Y.

64,673. Cotton and linen mesh cloth. Mark: "Deimelin." Owner: Deimel Linen Mesh System Co., San Francisco, Cal.

64,870. Cotton yarns. Mark: Mohawk. Owner: Utica Steam and Mohawk Valley Cotton Mills, Utica, N. Y.

64,871. Cotton yarns. Mark: Utica. Owner: Utica Steam and Mohawk Valley Cotton Mills, Utica, N. Y.